

American Society of Civil Engineers.

PROCEEDINGS.

Vol. XX.—January, 1894.

MINUTES OF MEETINGS.

(Abstract of such as may be of general interest to Members.)

OF THE SOCIETY.

JANUARY 3D, 1894.—The Society met at 20 o'clock, Vice-President Brush in the chair; F. Collingwood, Secretary. Ballots were canvassed and the following candidates were declared elected: As Members: Charles Albert Judson, Sandusky, O.; William Beswick Myers, London, England; Emile Theodore Quinette de Rochemont, Paris, France; Francis Joseph Edward Spring, Bombay, India; James Townsend Taylor, Riverside, Cal. As Associate Members: Julian Edward Caccia, Florence, Italy; Boyd Ehle, Fort Plain, N. Y.; James Isaac Hayercroft, Sydney, N. S. W.; Philip Walter Henry, New York City; Charles Pope Howard, Richmond, Va.; Hiram Phillips, Columbia, Mo.; Holton Duncan Robinson (elected Junior March 1st, 1892), New York City; Sidney Bacon Williamson, Bridgeport, Ala.

The death of William Clark Young (elected Honorary Member March 1st, 1892), on December 22d, 1893, was announced.

A paper by Theodore Cooper, M. Am. Soc. C. E., on "Train-Loading for Bridges" was read by the author. Written discussions were presented from Messrs. Charles S. Churchill, John C. Bland, John A. Fulton, Edwin Thacher and Ward Baldwin, and the paper was discussed orally by Messrs. L. L. Buck, Blakeley, G. H. Thomson and the author.

ANNUAL MEETING, JANUARY 17TH, 1894.

MORNING SESSION.—The meeting was called to order at 10 o'clock by the President, Mr. William Metcalf.

The PRESIDENT.—If any Past-Presidents are present, they are requested to take seats on the platform.

The Chair will appoint as Tellers to canvass the ballot Messrs. Ricketts, Breithaupt and McComb; and should any constitutional questions arise during the counting of the ballot, they can be referred to the meeting for solution.

The Chair will announce that there will be a meeting of the Board of Direction in the Society House immediately on adjournment or recess. It is almost certain, owing to the large number of ballots to be counted, that there will have to be a recess taken, and an adjourned meeting held to hear the result of the ballot. During the recess, the Board will meet in the front room on the third floor of the Society House. There will also be a meeting of the new Board immediately after the final adjournment of the meeting, for the purpose of organization.

The Chair will announce next the programme for the meeting and also for the excursion to-morrow, merely adding that, by request of the Committee of Arrangements, an invitation to join in this excursion is cordially extended to the ladies accompanying visiting members, and to the ladies of local members. This will be a delightful excursion and one the ladies will enjoy, and they will be made heartily welcome.

The next business in order is the presentation of the reports. The first will be the report of the Board of Direction.

(The Secretary read the report of the Board of Direction, which will be found on page 23.)

Before proceeding to dispose of this report the Chair will apologize for omitting one very important announcement, and that is that the ballot will close at 12 o'clock, sharp. All members desiring to vote or change their votes must do so by 12 o'clock, as, according to the Constitution, no votes can be received after that hour.

Since the meeting came to order the Chairman of the Annual Meeting Committee has presented the following letter, just received:

U. S. ENGINEER OFFICE,
Room F, 7 Army Building,
39 Whitehall Street.

NEW YORK, January 16th, 1894.

MR. CHARLES WARREN HUNT, AM. SOC. C. E.:

My dear Sir,—I have the honor to say that late last night I received a telegram from the Secretary of War authorizing me to show to the Society members who are American citizens, the batteries at Sandy

Hook, *excepting the interior of the Gun Lift*. All essential features of the construction will be shown.

I shall be at the wharf at Sandy Hook on the arrival of your boat, ready to escort the Society direct to the batteries.

I request that this inspection be made *first*, as I have an engagement in the city which will demand my attention in the afternoon.

Very truly,

G. L. GILLESPIE,

Lt.-Col. Engineers.

That permission makes the excursion complete, as everything will be shown to the Society which it is proper for anybody to see at Sandy Hook.

You have now before you the report of the Board of Direction; what disposition will you make of it?

Past President MENDES COHEN.—I move its acceptance. (Seconded.)

The PRESIDENT.—It is moved and seconded that the report of the Board of Direction be accepted; that carries publication with it. Are there any remarks? (The motion was carried.)

Mr. ROBERT CARTWRIGHT.—Mr. President, in relation to the information we have just received, the letter states that only American citizens should participate. How are we to cull them out?

The PRESIDENT.—The Committee of Arrangements will have to see to that, and the best way to do it; this is a request that comes from the Government.

Mr. CARTWRIGHT.—That is why I saw the necessity of having it defined. We had better make a pretty rigid examination in this matter, because we want to keep ourselves right on the record hereafter.

The PRESIDENT.—The Committee understands that, they will see that the order is complied with as far as possible.

The SECRETARY.—The next report is the report of the Treasurer. (Read the report, see page 29.)

The PRESIDENT.—What shall be done with the report of the Treasurer?

A MEMBER.—I move it be accepted. (Seconded.)

The PRESIDENT.—It is moved and seconded that the report of the Treasurer be accepted; are there any remarks? (Carried.)

The next business will be the report of the Auditor.

The Secretary read the report of the Auditor and of the Finance Committee (see pages 30).

The PRESIDENT.—Gentlemen, you have heard the report of the Auditor and the accompanying report of the Finance Committee; what is to be done with them?

Mr. JOHN THOMSON.—I move that the reports as read be accepted, placed on file and printed in the *Proceedings*. (Carried.)

The PRESIDENT.—The next is the report of the Committee on Information and Courtesy.

(The Secretary read the report, see page 36.)

The PRESIDENT.—You have heard the report; what is to be done with it?

Mr. COHEN.—Mr. President, this report of the Committee on Information and Courtesy—a special committee, I believe, for the past year—seems to call for some recognition on the part of the Society of the very efficient work which was done. I would therefore move that the report be accepted and that it take the usual course with the other reports; that it be printed, and that the thanks of the Society are due and are hereby made to the Committee for their excellent and very efficient work. (Seconded.)

The PRESIDENT.—You have heard the motion; are there any further remarks? (Carried.)

Before proceeding with the reports, the Chair will repeat the announcement that the polls are open until 12 o'clock; any members who come in late who wish to vote, or to change their vote, will have the opportunity up to that hour. While the Tellers appear to be shut up in the little room there, they are publicly counting the ballots and are open to the visits of any who wish.

The PRESIDENT.—The next report in order is the report of the Committee on the award of the Norman Medal.

(The Secretary read the report of the Committee, see page 40.)

The SECRETARY.—The report on the Rowland Prize is not ready, I am sorry to say. I hope we may be able to announce it before the close of the meeting.

The Secretary next presented the report of the Committee on Standard Time (see page 40) in the shape of several letters from Mr. Sandford Fleming, with enclosures of other letters.

The PRESIDENT.—You have heard the report of the Committee on Standard Time; what disposition shall be made of it?

Col. CRAIGHILL.—I move that the report be accepted and the Committee be continued. (Carried.)

The PRESIDENT.—The next report will be on Units of Measurement.

The SECRETARY.—This Committee is one that was organized several years ago, and has never done any work. The Chairman, Dr. Eggleston, resigned, and by direction of the Board I requested Mr. Bond to serve; he sent some time ago a letter requesting that the Committee be discontinued, and offering the resignation of its members.

Mr. DESMOND FITZGERALD.—I move that the report be accepted and the Committee be discontinued. (Seconded.)

Professor E. A. FUERTES.—I desire to amend this proposition by having the resolution read that this report be accepted and a new committee be appointed.

Mr. FITZGERALD.—I accept the amendment.

Mr. FUERTES.—I think that this is a question of great importance, and as a professional representative, the engineer should not shirk the duty of grappling with it. Our absurd, unscientific and arbitrary units of measure and weight cause great complications in estimates, waste of time in reductions, and, by a spirit of retrogression, inexplicable in this country, we are, as it were, isolated from the rest of the scientific world. Whenever we desire to come in contact with the rest of mankind, we pay the tribute of loss of time in painful reductions. We follow England in the absurdity of our common and special measures, which nobody else uses, that we, ourselves, do not fully understand, that our best experts cannot fully define, or we can never hope to memorize. The works in drawings of foreign engineers mean nothing to us, for we cannot understand their measures even when we understand their languages.

Much has been said to no purpose about the disorder of the "revolution of measures"; but this is only a phantom in the eye of the Anglo-Saxon races, who, besides being overbearing, are by no means the most orderly people in the world, as their indefensible position on this point amply demonstrates. Let us have a committee willing to study this question and capable of giving it proper shape. Why should we punish our sons and daughters with month after month of study without ever being able to understand or remember what our measures mean, if this, and other more transcendental annoyances, can be avoided? I fear we never shall have peace in this matter until by the "survival of the fittest" our present lack of system shall have been abolished. That it will be abolished is, unqualifiedly, a certainty. Let us keep this Committee at work.

Mr. FITZGERALD.—If the gentleman agrees, I move that the selection of the Committee be left to the President.

The CHAIR.—The question before you is the acceptance of the report from the Committee on Units of Measurement, the discharge of the committee, and the appointing of a new Committee, or a new set of members, by the Chair. Are there any further remarks?

Mr. COHEN.—Mr. President, it seems to me to be a question, if this Committee be discharged and that report be accepted as final, whether a new committee can be thus simply appointed, under the Constitution. The Constitution provides that committees on engineering subjects shall only be appointed in a certain specific way. Now, if it be desirable to continue the investigation of this subject by a committee, it can only be done, I think, by the resignation of members from the Committee and the substitution of others in their places. The object of my remarks is merely to remind the Chair of the constitutional point.

The PRESIDENT.—The Chair had that point in mind and would have put the question finally in this shape: The motion is, first, that the

report be accepted, and the resignations offered of the members of the Committee be accepted. The second part is, that the Board be authorized to appoint members in place of those who have resigned. I believe that covers it.

MR. COHEN.—That would cover it.

THE PRESIDENT.—Are there any further remarks? All in favor of the acceptance of the report and that the resignation of the members of the Committee be accepted, say "aye." (Carried.)

All in favor of the continuance of the Committee by the appointment of a new set of members, say "aye." (Carried.)

Before proceeding to the reading of the next report, the Chair will simply say that the appointment of the new committee will be transferred to the successor of the Chair. We will call for the report of the Committee on Badges; you will find it published in the printed slips. Is Mr. FitzGerald present, to read the report?

MR. DESMOND FITZGERALD.—There are a number of statistics here, and it seems hardly worth while to spend the time in reading the report; still, if the members so desire, I will read it. (Read the report. See page 37.)

THE PRESIDENT.—This is a very full report that you have just heard on a subject that has excited a great deal of interest from time to time, with no recommendation by the Committee. What disposition will you make of the report and of the subject?

MR. FITZGERALD.—I have not had an opportunity to confer with my associates on the Committee. I take no interest in the matter one way or the other. I have gone into the work perfunctorily and have done it mechanically. These are the simple facts, but I would suggest that it would be as well to let this come before the Society, and let the members muddle over it for six months or a year.

COLONEL CRAIGHILL.—I think it is due to Mr. FitzGerald that the members of the Society should understand that the work of this Committee has mainly been done by him, and it has involved a great deal of labor and time. Now, the Society having received the report, as a member of the Committee, I think it ought to be endorsed, and that our thanks should be most cordially given to Mr. FitzGerald for the work he has done. Certainly he has mine.

I differ with him as to feeling indifferent on the subject, because I think the existing badge is a very insufficient representative of the Society. I have long been dissatisfied with the badge, and am anxious to see another one adopted; so I hope the matter will be fully discussed on this occasion, and that some committee, whether this or a new one, will continue the study of the subject. I wish to see a new badge more worthy of the Society than the present one, more indicative of its work, and that the Society, at this meeting, will give instructions for the continuance of the work of the Committee.

Mr. CLEMENS HERSCHEL.—I move that the Committee be continued, with instructions to make recommendations at their next report.

The PRESIDENT.—Do you intend to carry with that motion that the report should be accepted and printed?

Mr. HERSCHEL.—Yes, sir. (Seconded.)

The PRESIDENT.—It is moved and seconded that the report be accepted and printed in the *Proceedings*; that the Committee be continued and instructed to make recommendations in their next report. Are there any remarks?

Mr. FUERTES.—I would like to add, that the Committee be requested to furnish designs. It seems to me that, if skillful artists were consulted, with the aid of such artistic jewelers as Starr or Tiffany, and with the views presented by this discussion and what the Committee might suggest, we could obtain a badge or emblem that we would not be ashamed to wear. The majority against our present Bowery pin is quite significant. To my mind, its supreme merit lies in its perfect and satisfactory ugliness. It is also redolent with the prolonged perspiration of hard work in the woods, and it seems to lift our noble profession only high enough to declare us competent to survey an old farm.

The meritorious design I am quite sure could be secured by the means I proposed, should be photo-lithographed, numbered and submitted to a ballot.

The PRESIDENT.—Are there any further remarks?

Mr. SAMUEL WHINERY.—It seems to me that this might be divided into two suggestions: First, the suggestion of the proper idea, the suggestion of the design itself; and second, the working out of the proper form. For the first part of the work it seems to me (and I will so suggest) that the Committee should ask the members of the Society to send in suggestions, and, after that, that the Committee be authorized, if necessary, to secure the services of a competent artist to put the matter in such shape as may be desirable.

The PRESIDENT.—The authority to employ an artist would involve a question of expense, and would come properly from the Board of Direction.

Mr. FOSTER CROWELL.—I think the artist should be called upon first. We have seen in these responses to the Committee's circular that a great number of members have suggested designs, and they are more or less ingenious, and certainly no one can complain of a lack of variety; but none are of such a character as to recommend themselves. The work of designing a badge is something more than an expression of an idea, it is the work of a craftsman. I think the gentleman who spoke before Mr. Whinery has put the thing properly, and that this matter could never be carried out by volunteers. I think that, when the time comes, the employment of an artist, such as St. Gaudens, or some other dis-

tinguished designer, would give us a solution that would be very simple. We would not call upon amateurs to make a design for any work in any other department of art. I hope that the matter may be carried on, and that it may be put in that form; that the Board may be authorized to employ an artist to consult with them, a competent person, and get one or two designs to present to the Society at the proper time.

The PRESIDENT.—The Chair would rule that under the general authority of the Board it would be entirely proper for the Board at any time to authorize the Committee to incur the expense, and it would not be proper that this meeting should give such authorization.

A MEMBER.—What is the motion?

The PRESIDENT.—The motion is that the report of the Committee on Badges be accepted and printed; that the Committee be continued to carry on the work, and in their final report, or in the next report, to make recommendations to the Society. (Carried.)

We now have the report of the Rowland Prize Committee.

The Secretary read the report (see page 40).

The Secretary then read (in part) a report from the Committee on Uniform Methods of Testing Materials used in Construction. This report was found to be incomplete, and was presented by the Secretary through a misunderstanding of the wishes of the Chairman. After some discussion, it was moved, seconded and carried that the report be not received in its present form.

The PRESIDENT.—The Chair will now bring before the meeting the proposed amendment to the Constitution:

"As provided in Article IX, Sections 1 and 2, the undersigned propose the following amendment to the Constitution of the American Society of Civil Engineers:

"Amend Article III, Section 9, as follows: By striking out the words 'resignation has not been tendered or,' and inserting after 'defence,' eighth line, the words 'has not been.' The clause so amended will then read:

"Not less than two months after such meeting the Board of Direction shall finally consider the case, and if a defence has not been made which is satisfactory to the Board, it shall then notify the person that he will be expelled in one month, unless he elects to appeal from this decision."

Respectfully submitted,

O. F. NICHOLS,

FOSTER CROWELL,

JOHN THOMSON,

CHARLES B. BRUSH,

L. L. BUCK,

CHARLES WARREN HUNT.

What action is to be taken? The Chair will state that this amendment is now before the meeting, subject to any amendment the meeting may see fit to make, and then to be either sent out for ballot, or not sent out, as this meeting shall decide.

A MEMBER.—May I ask for the reading of the clause in its present form?

The PRESIDENT.—This is an amendment to Article III, Section 9. It is in reference to the mode to be employed in expelling a member, in case such a calamity should ever happen; it has never yet occurred. The members will notice that the Constitution as it now reads leaves the party charged with delinquencies by ten or more members, should the charges lead to his expulsion, the option of resigning, which would enable a member to avoid any punishment, in case such were deemed necessary. The object is to take away the privilege of resigning. The proposed amendment is to amend Article III, Section 9, as follows. (Read the amendment.)

A MEMBER.—The object is to prevent him from resigning. Does the Constitution now require that the governing body shall accept his resignation? Does it imply that they are obliged to accept the resignation when offered?

The PRESIDENT.—It would seem that the permission to resign, the right to resign, would compel the Board to accept the resignation.

Mr. COHEN.—Mr. President, I am opposed to the proposed amendment, and I am very clear in my own mind that there is no advantage to be derived by the Society from its adoption. The object of considering the expulsion of a member is because he is held to have committed some discreditable act and one which his associates in the Society, an honorable society and one which desires no connection with men who are not equally honorable, would disclaim, and therefore they would be glad to be rid of him. The allegations are made, and he is notified; if the man tenders his resignation, what does this Society gain by insisting upon it that it shall have further investigation, and that it shall have the gratification of dismissing him? Will it be a gratification? I think not. The only thing the Society desires is to be rid of the individual, and if he accepts the situation and says, "I will withdraw," why not let him go in peace? What do we want to fight him for? And suppose we did go into an investigation and hold high court and commit some foible or mistake in it, and have him aroused to a recognition of the fact that we have done him an injury; then we are exposed to suits at law and all sorts of investigations such as you hear of in your social clubs. This is not a trade society, where we are to expel a man if he does something a little contrary to the body of the members; it is an engineering society, and if such charges are brought against the honor and integrity of the individual as would make him resign, I think we should accept the resignation gladly and not go into an investigation that would stamp him as a knave; that is none of our business; let him go. Those are my views, sir.

The PRESIDENT.—Are there any further remarks?

A MEMBER.—I move that this amendment be laid on the table.

The PRESIDENT.—The proper question to vote on is, shall this amendment go out for ballot, or shall it not. All in favor of issuing this amendment to the society say "aye." (The motion was lost.)

The PRESIDENT.—The next question to be taken up is the settlement of the time and place for holding the Annual Convention. The Secretary has some recommendations to read.

The SECRETARY.—In response to the circular-letter that was sent out, answers have been received and summed up as follows:

SUMMARY OF SUGGESTIONS RECEIVED IN REFERENCE TO PLACES FOR
HOLDING THE ANNUAL MEETING.

New York City,	suggested by.....	28
Boston,	"	19
Pittsburgh,	"	15
San Francisco,	"	11
Niagara Falls,	"	10
Saratoga,	"	9
St. Louis,	"	9
Washington,	"	8
Chicago,	"	7
Denver,	"	7
Providence,	"	7
Cleveland,	"	4
Lake George, N. Y.,	"	4
Montreal,	"	4
Newport,	"	4
Philadelphia,	"	4
Baltimore,	"	3
Bar Harbor, Me.,	"	3
Cincinnati,	"	3
Detroit,	"	3
Duluth,	"	3
White Mountains,	"	3
Atlantic City,	"	2
Helena, Mont.,	"	2
Ithaca, N. Y.,	"	2
Kansas City,	"	2
Louisville,	"	2
Mexico City,	"	2
Narragansett Pier,	"	2
Old Point Comfort,	"	2
Portland, Ore.,	"	2
Salt Lake City,	"	2
Saranac Lake, N. Y.,	"	2
Seattle,	"	2
Toronto, Canada,	"	2
West Point, N. Y.,	"	2

The following places were also suggested:

Adirondacks; Albany, N. Y.; Alexandria Bay; Asheville, N. C.; Asbury Park; Atlanta, Ga.; Austin, Tex.; Blue Mountain House, Md.; Bridgeport; Cape May; Colima, Mexico; Colorado Springs; Delaware Water Gap; Excelsior Springs, Mo.; Fort Cove; Four Seasons Hotel, Middlesboro', Ky.; Geneva, N. Y.; Lake Hopatcong, N. J.; Las Vegas, N. M.; Manitou, Colo.; Milwaukee; Minneapolis; Nantasket Beach; New London, Conn.; Pueblo, Colo.; Richmond, Va.; some point on Lake Erie; Tacoma, and White Sulphur Springs, W. Va.

The President.—What action will the meeting take in reference to the next place for holding the Annual Convention?

Mr. J. M. KNAP.—I move that the whole matter be left to the Board of Direction to decide. (Seconded.)

The President.—It is moved and seconded that the fixing of the time and place of the Annual Convention be referred to the Board for action. Are there any remarks?

A MEMBER.—With power?

The President.—Exactly; I said, for action. The question is that the fixing of the time and place for holding the Annual Convention be referred to the Board, with power. (Carried.)

All the regular reports before the Society have been acted upon, and in the interval before the polls close, new business will be in order. Any suggestions that any members have to make or matters to bring up are now in order.

As members have been coming in constantly during the meeting, the Chair would announce again that the polls are still open, and will be until 12 o'clock; if any members have not voted, they may do so within the next 11 minutes.

Mr. CROWELL.—Mr. President, in the report of the Committee on Information and Courtesy, which has been accepted by the meeting, a suggestion occurs which may possibly be worthy of a little consideration. It is in regard to carrying out the idea of furnishing and obtaining information in other countries than ours. An American engineer traveling in other countries has naturally great difficulty in getting information of a technical character in the places where he happens to find himself, even more than the foreigner does in this country. Since the return of the engineers who visited us this last summer, communications have been received from several of the foreign societies, coming in the form of acknowledgments for the services that have been rendered, and suggesting that the example set here is a very good one for them to follow; and it has occurred to the members of the Committee on Information and Courtesy, in making this recommendation, that if the Society were simply to authorize the Board to carry on the idea, through its officers, maintaining a fund of information for those who visit us and informal correspondence with other societies, it

might be possible in a short time to establish throughout a number of foreign countries such facilities as would be very advantageous to us when we go there. I call attention to the suggestion in the report, and if you will allow me, I will read it:

"The many acknowledgments made by visiting engineers of the aid derived from the reference map and our introductions, lead your Committee to suggest that this work, revised from time to time, might be continued under the direction of the officers of the Society with great advantage to our own members, as well as to members of foreign societies visiting this country in the future. If the engineering and technical societies of other countries should co-operate with us and extend like courtesies to us and to one another, it would result in great convenience to all members of the profession."

In adopting the report this meeting has, I believe, taken no special action in regard to this particular feature. I would like to ask the attention of the members present to it, particularly.

THE PRESIDENT.—Do you make any motion?

MR. CROWELL.—I have no motion to make at this time.

THE PRESIDENT.—It is a subject perhaps well worthy of discussing in the few minutes left before the polls close, as to whether it is worth while for this meeting to take any action at all in the way of a recommendation to the officers of the Society, to continue the work so admirably done during the past summer, to make it a permanent work of the Society; there is no motion before the house.

The Chair is informed that some members have gotten a wrong impression from the letter of Colonel Gillespie, in which he states that we are to have permission to visit the forts to-morrow, and mentions the fact that he will take the 7 o'clock boat. That does not mean that members are to take the 7 o'clock boat. The excursion steamer is to go at 10 o'clock. The request of Colonel Gillespie is that the members will inspect his part of the work first, in order that he may return to the city. It was supposed the first thing to be done was to see some of the experimental firing; it simply reverses the order of the arrangements.

MR. CHARLES B. BRUSH.—Mr. President, I understand it is probable that it will take all the afternoon to count the votes, and I want to ask whether, in view of that fact, it would not be well to adjourn, when we do adjourn, to 8 o'clock this evening. There is no necessity for the members remaining here simply to receive the announcement of the vote. That will leave the afternoon free for our members and visitors to go where they please. It seems to me it is more desirable to adjourn to 8 o'clock.

THE PRESIDENT.—The Chair will now declare the polls closed; it is 12 o'clock. The Tellers inform the Chair that they will probably be through about 4 o'clock, and an adjournment or a recess may be had until 5 o'clock, or a recess may be taken until 8 o'clock, as the Society may determine. The Chair would simply call attention to the fact that

there is a programme arranged for this evening in the Society House, and the question would be, if we adjourn until evening, whether we are to adjourn to meet in the Society House and receive the announcement there at 8 o'clock, or have a recess now until 5 o'clock, to meet here and receive the announcement.

Mr. BRUSH.—I move that when we adjourn we adjourn to 8 o'clock, at the Society House, and receive the announcement of the Tellers. Is the stereopticon lecture to be held here?

The SECRETARY.—Yes, sir.

Mr. BRUSH.—Then I change my motion, that when we adjourn we adjourn to meet here in this house.

The PRESIDENT.—The motion is that the meeting take a recess until 8 o'clock, at this place. (Seconded.)

That will throw the meeting of the new Board over until evening. Before putting the motion the Chair will remind the members that lunch will be served in the Society House. The Board of Direction will meet immediately on adjournment, at the Society House, third floor, front room. The Board will be glad to meet any members of the incoming Board.

All in favor of adjournment to 8 o'clock at this place, say "aye."
(Carried.)

EVENING SESSION.—President William Metcalf in the chair.

The PRESIDENT.—The first business to come before the meeting is the announcement of the report of the Tellers, which is as follows:

We, your Tellers, report the following as a correct account of the ballots received and opened this day for officers of the American Society of Civil Engineers:

Total number of ballots received.....	920
Delinquent on dues.....	4
Without signature.....	1
Otherwise informal.....	74
Votes counted.....	841

<i>For President.</i> —Wm. P. Craighill.....	837
E. L. Corthell.....	1

<i>For Vice-Presidents.</i> —Jos. M. Wilson.....	814
Francis Collingwood.....	179
Chas. C. Martin.....	668
Theodore Cooper.....	1

<i>For Secretary.</i> —Francis Collingwood.....	501
Charles Warren Hunt.....	339

<i>For Treasurer.</i> —John Bogart.....	824
A. P. Boller.....	1
E. S. Gould.....	1
O. F. Nichols.....	1
<i>For Directors.</i> —Bernard R. Green.....	836
T. Guilford Smith	834
Robert B. Stanton.....	834
Henry D. Whitcomb.....	835
Wm. H. Burr.....	837
Joseph M. Knap.....	834
E. P. North.....	1
J. C. Bland.....	1
Wm. A. Haven.....	1

Respectfully submitted,

PALMER C. RICKETTS,
WM. H. BREITHAAPT,
D. E. McCOMB.

The Chair will announce, therefore, as the result of the election:

For President, William P. Craighill; for Vice-Presidents, Joseph M. Wilson and C. C. Martin; for Secretary, Francis Collingwood; for Treasurer, John Bogart; for Directors, Bernard R. Green, T. Guilford Smith, Robert B. Stanton, Henry D. Whitcomb, William H. Burr, Joseph M. Knap.

Mr. CHARLES B. BRUSH.—I move a vote of thanks to the Tellers who prepared that report. I understand they worked solidly from eleven this morning to six o'clock this evening.

The PRESIDENT.—It is moved and seconded that the Tellers receive the thanks of the Society for the large amount of work they did in counting this vote. (Carried.)

Mr. CHARLES E. EMERY.—Mr. Chairman, there are undoubtedly many present who have not had the pleasure of meeting the President elect. I therefore make the motion that a committee be appointed by the Chair to escort him to the platform and that he be presented to the meeting. (Carried.)

The Chair appointed Mr. Leverich and Mr. Emery a committee, who escorted Colonel Craighill to the platform.

THE PRESIDENT.—Gentlemen, I have great pleasure in presenting to you your President-elect, Col. William P. Craighill.

Col. CRAIGHILL.—Mr. President and gentlemen, I return you most sincere thanks for the honor you have done me. Some years ago, when I was elected a Member of this Society, I esteemed it a privilege; later, when you elected me a member of the Board of Direction, I considered

it an honor; and now, when you have chosen me to be the President of the Society, I consider it a high distinction, of which I am greatly proud. It is a distinction to be President of the Society of Civil Engineers, and I feel it most sensibly, I assure you. When I recall some of the eminent men whose names have graced our rolls, whom just to mention makes this Society distinguished; such men as Eads, Francis, Gillmore, McAlpine, Milnor Roberts, and others whom I might name, whose fame is known, not only in this, but in other countries, I am doubly sensible of the honor you have conferred upon me. And I might add the names of living members, who have already executed works great in magnitude and brilliancy, to those of the great men who were once with us, but have passed away, leaving their fame full and their memory honored.

But, gentlemen, I am very conscious the compliment you have paid me is chiefly because I happen to be one of the senior members of the Corps of Engineers of the United States Army, and from that point of view, I also thank you most heartily and cordially, and I am quite sure that what you have done in electing as your President a member of that corps will be beneficial, certainly to the Corps of Engineers, and I hope to this body also; it will bring them more closely together, into more harmonious working than has been the case before, and that, I think, is a great advantage, where two bodies of earnest, capable men can work together satisfactorily for the good of our common country and for its honor and glory. I think that is a great result to accomplish.

I will not detain you longer. When the proper time comes I shall be ready to assume the duties which the Constitution imposes upon me as the President of the Society, and in that connection it is a great comfort to the incoming President to know, that under the Constitution, while the supervision of the affairs of the Society is committed to him, their management is in the hands of the Board of Direction, and I assure you that those affairs are thus in safe hands. I wish to-night to say in the presence of this body of civil engineers of this American society, that nobody can realize the value of that Board to this institution who has not seen its workings; the amount of work, the anxious care and thought, that are given are not appreciated except by those who have seen it, and I consider myself extremely fortunate in having been associated for the past two years with such a body. I congratulate the Society in having such a Board for the management of its affairs.

I can only say in conclusion that whatever ability I have will be given most earnestly and sincerely to the good of this Society. (Applause.)

The PRESIDENT.—The Secretary has a communication to make.

The SECRETARY.—I wish to make a brief communication to the Society.

NEW YORK, January 17th, 1894.

To the American Society of Civil Engineers:

It will doubtless be conceded, without argument, that the most rapid advancement of the Society will be promoted by interesting the young men of the profession in its affairs. The professional advantage accruing from friendly intercourse, and especially from the presentation of well-written papers at our meetings, is not fully appreciated by our older members, and it is not strange that there should be among the Juniors a tendency to lose interest in the Society after a limited experience in its membership.

One of the most certain means of increasing this interest will be the establishment of a fund for the annual award of a prize or medal for the best paper presented during the year by a Junior. Having long been convinced of the desirability of such a fund, and feeling now that I can donate the same without having my motives questioned, I desire to present to the Society a bond for \$1 000, of the annual value of \$50, the principal sum to be continually invested, and the interest to be devoted annually to the purpose named.

Should the Society accept this donation, I would request the privilege of conferring with a committee of the Board of Direction as to the rules under which the award shall be made.

Respectfully submitted,

F. COLLINGWOOD.

Mr. COHEN.—Mr. President, I arise to express my extreme gratification at the announcement which we have just heard. That such an interest on the part of the young men should be excited is eminently desirable, and that Mr. Collingwood, our Secretary, should have first felt the need and necessity for it and then should have himself stepped forward into the breach to fill the need is extremely gratifying to me, and I am sure must be to all of us. I have no doubt it will be the commencement, in many respects, of a new era. The work of the Society in the past has been developed by the older heads, and the young men have been here, as they have doubtless felt, merely to listen, and now with Mr. Collingwood's gift we shall begin to reap a result. If it is in order I would move that the Society gratefully accepts this donation of Mr. Collingwood, and that a committee of the Board be appointed, as he has suggested, to arrange the details for accepting the gift.

The PRESIDENT.—Gentlemen, you have heard the remarks. I feel that I cannot add anything to them; you all must feel just as I do, and as Mr. Cohen has expressed.

The motion is, that the Society accept with gratitude the offer made, and that the donor be authorized to arrange with a committee of the Board for the details for the use of this prize to be given to the work of the Junior members. Are there any further remarks? (Carried.)

The Chair has been requested by the Board to state to this meeting that it considered the manner of presenting reports to the annual conventions or annual meetings by committees appointed by the Society to investigate engineering subjects. Such reports, generally of much interest and importance, are usually presented without previous notice and in such a way as to prevent their discussion by the members present, thus depriving the meetings of one of the most important and useful of their functions. The Board took the matter up and discussed it very thoroughly and found that the Board had no authority in the matter whatever. The disposition was to require that such committees should report to the Secretary, and through him to the Board, at least 30 days before the Annual Meeting or the Annual Convention, in order that such reports of committees could be printed in abstract and sent to the members of the Society who could have these reports and consider them and come to the annual meetings or conventions with some knowledge of what was to be presented. Upon a careful examination of the Constitution it was found that the Board had no authority whatever to act in such a matter. These committees are appointed, as you all know, by a vote of the Society, and they are to report to the Society; there is no provision made as to when they shall report, or how they shall report, or what they shall report. The Board, therefore, appointed a committee of three to take the matter into consideration and bring it before the meeting this evening. The chairman of that Committee is ready to report, and I will call upon him to state the matter more explicitly. Mr. Whinery.

Mr. SAMUEL WHINERY.—In relation to the matters to which you have just referred, the Committee has considered the subject and asks me to report the following resolution:

“Resolved, That reports of special committees upon engineering subjects shall be presented to the Secretary of the Society at least 30 days before their presentation to the Society at a business meeting, and shall be printed and sent out to the membership as soon thereafter as practicable, in the same manner as advance copies of papers are sent out, and with a proper cautionary notice that the report has not yet been presented to the Society, and is issued for the purpose of information and discussion only, with all rights of publication reserved.

The PRESIDENT.—It is moved and seconded that the resolution presented by this committee of the Board be adopted; are there any remarks? (This motion was carried.)

The Chair and the Executive Board of this Society have nothing further to present to this Annual Meeting. If any member has any business to bring forward, it will be in order to present it at this time.

If no members have any new business to bring before the Society, before declaring the final adjournment of the business meeting of this Annual Meeting of the Society, the Chair would like to announce, first, that, in accordance with a resolution of the Board of Direction to-day, the Board adjourned to meet at the call of the President. The President now announces that immediately after the formal announcement of the adjournment of the business meeting the members of the Board are requested to meet in the Society House to organize the work of the Society for the next year.

The Constitution requires that at the Annual Convention the President shall make an address, and he does it; he has to do it. Sometimes it is an address covering the work that has been done during the past year, or what is going to be done the next year; or sometimes an address that does not cover anything. But the Constitution makes no provision whatever for anything from the President at the close of his term, and it may seem a little presumptuous in me, possibly, yet it may be well to establish a precedent for the President to say a few words to the members before he retires. And particularly, the President would like to emphasize one point the President-elect has mentioned this evening; that is, the value of the work of the Board and the character of the men who compose the Board of this Society. No one, I do not care what his eminence may be, or what position he may have reached in life, can meet such a Board as this Society has, especially as its presiding officer, without feeling that he has been honored by being allowed to preside over such a body.

But more than that—and I speak particularly to the non-resident members—there are very few people in the Society, and certainly very few outside of the resident membership, who have any idea of the amount of work that that Board performs; the amount of detail that comes before it, the amount of care that is required to look after the interests of this great society, scattered all over our Union. It has been my pleasure, and I think it has been a great honor to me, to serve, not only as a member of that Board, but also as the presiding officer, and I know that the work is arduous, I know also that it is performed with great care and with great detail by the Board. What I want to reach particularly in these remarks is this, that it never occurs when a man applies for membership in this Society, whether it be as full Member, Associate Member or Junior, if he is postponed by the Board, or turned down by the Board, or relegated to a lower grade, but that he feels himself abused and outraged, and nine times out of ten that gentleman writes some very peppery letters to the President, or somebody else, stating that it is the "New York clique" doing this thing, that they will not let anybody in outside of the resident district. I want to say particularly—I am now talking to the non-resident mem-

bers—so far as my service on the Board has given me experience, and also as President of the Society, I have never been able to discover any New York clique; there is no such thing. While the Board is compelled, time and time again, to decline applications or to lower the grade, because of insufficient record or unsatisfactory responses from references, yet members should consider that it happens—I am sorry to say, that it happens, but it does happen—not quite so often as under the old way, but still too frequently, that when an application comes before the Board, there come to that Board also, in response to inquiries, very positive statements that so-and-so ought not to be allowed to enter the Society under any conditions. The Board takes up every case of that kind, writes, not only to the party making the statements and to the applicant, but to everybody they can find who may know of the facts, and it has happened within my experience that in several cases, where statements of that kind have been made, the Board has found that they have come entirely from personal malice; and the Board has issued the ballot for the election of the maligned person. Every man who is turned down feels himself aggrieved, while he is turned down simply because his record does not justify the Board in classifying him to the grade that he asks for, and the Board has nothing to do but to act strictly according to the Constitution in that; yet members outside do not consider this. There are in this Society to-day members who never would have been there if the Board had listened to what we might say was simply ill temper. It hardly ever happens that an application is made from the resident district, but that some one or more members of the Board know that party, and such members of the Board, being honorable men, can each say to the Board, "Gentlemen, I know this candidate and know his record is all right," and that is sufficient and satisfactory; but when a candidate happens to be in Oregon or California or Florida, it is a little more difficult to get information, and also it takes a little more time, and the applicant ought not to be impatient, nor should he charge the delay to the wish of a clique to keep him out. I say this because I know that, although there is not a large element in the Society that entertains this feeling against resident members, yet there is such feeling. I have received in the past year several letters addressed to the President of the Society, making the most bitter complaints that had no foundation whatever, that there was a New York clique trying to keep them out. I happen to know from my own personal knowledge that there is no such clique. Consider what the result would be if the Society headquarters were in Philadelphia, or in Washington, or in New Orleans, or in Cincinnati, or in Chicago, how could you get along without a resident Board, a resident working quorum? Anywhere, no matter where, we would have the same complaints.

I think that I am justified in saying what I have said in regard to this matter, because I have seen what our President-elect has so beautifully spoken of to-night, the large amount of work done by the Board of this Society and the anxious care which the members of that Board give to the work; three, four and five hours at a time, sitting into the small hours of the morning, they discuss everything with the greatest care, and it is due to the Board that the membership should know just what the work amounts to. The non-resident members of the Board do not come here more than about once a year. When they do come they find the Board hard at work, they receive a hearty welcome, and they join in and help with the work. I would say to all non-resident members, if you feel aggrieved, apply to your own particular member and tell him to come to New York and straighten things out. There is no such thing as a New York ring, there is not any ring that is trying to run this Society in the interests of anybody in New York or anywhere else; they are all working all of the time for the great body of the American Society of Civil Engineers.

We should all remember that this is a large society scattered over the whole country, and that it becomes more difficult each year to keep the membership strictly within the professional limits laid down in the Constitution; when this is done, those who are members feel safe in their associations; and if those who are out find the entering not too easy, they will be all the better satisfied when they come in.

As a matter of fact, there are eminent engineers in the country who ought to be respected members of the Society, and who are not so simply because they were blackballed from some motives of ill-feeling, and it is not very wide of the mark to say that there are quite as many errors made outside of the Board as there are by it.

I have nothing more to say, except to thank you all for your indulgence and for the kindness and courtesy which I have received this year, and to express my appreciation of the great honor I have had in having been elected to preside.

The members of the Board of Direction will please retire at once and meet in the Society House.

The business meeting of the Annual Meeting of 1894 is now adjourned, and I will call upon Vice-President Brush to take charge of the balance of the programme for the evening.

Mr. SPENCER MILLER, Assoc. Am. Soc. C. E., then presented his paper on "Cable-Ways," which was illustrated by stereopticon views.

THURSDAY, JANUARY 18TH, 1894.—This day was devoted to an excursion. After an inspection of the new pier of the "American Line," at the foot of Fulton Street, North River (by invitation of Mr. Wright, General Manager), the party embarked in the steamer *Laura M. Starin*, which proceeded directly to Sandy Hook, and was there received by Lt.-Col. G. L. Gillespie, Corps of Engrs., U. S. A., and, conducted by him, visited the fortifications, mortar batteries, etc., in progress under his charge. Lunch was served on the steamer, after which, by permission of Brig.-Gen. D. W. Flagler, Chief of Ordnance, U. S. A., and the courtesy of Captain Frank Heath, commanding, a visit was made to the Proving Grounds, where experimental firings and a test of armor-piercing projectiles were made for the entertainment of the party. The return to New York was made at 5 P.M.

In the evening a reception, tendered by the resident membership, to visiting members and other guests of the Society, was held at the Society House.

The members of the Society of the various classes, 211 in number, present at the Annual Meeting, excursions, etc., were: C. H. Allen, Kenneth Allen, William A. Ayerigg, John W. Bacon, William S. Bacot, Carrol Ph. Bassett, Charles J. Bates, George Baum, Arthur Beardsley, John A. Bensel, Bernt Berger, George H. Blakeley, John Bogart, John B. Bott, C. P. Bonnett, L. B. Bonnett, George W. Bramwell, W. H. Breithaupt, P. F. Brendlinger, Waldo C. Briggs, H. W. Brinckerhoff, Daniel P. Bruner, Charles B. Brush, L. L. Buck, R. S. Buck, William D. Bullock, Robert Cartwright, W. A. Cattell, Nathaniel Cheney, S. H. Chittenden, Mendes Cohen, Howard J. Cole, F. Collingwood, C. B. Comstock, Howard Constable, S. L. Cooper, Theodore Cooper, E. L. Corthell, Wm. P. Craighill, J. James R. Croes, Foster Crowell, John Y. Culyer, David W. Cunningham, Chandler Davis, Frank P. Davis, John Sterling Deans, W. F. Dennis, S. L. F. Deyo, P. P. Dickinson, Standcliff B. Downes, James Duane, H. F. Dunham, Horace L. Eaton, C. C. Elwell, Charles E. Emery, Oscar Erlandsen, John T. Fanning, W. L. Ferguson, Burr K. Field, Clark Fisher, Janon Fisher, Desmond FitzGerald, J. Leland FitzGerald, J. Foster Flagg, A. Prescott Folwell, John D. Fouquet, John R. Freeman, A. Fteley, Frank L. Fuller, Martin L. Gardner, F. Lynwood Garrison, Charles W. Gay, James K. Geddes, H. H. Gladding, Charles E. Goad, Edgar B. Gosling, Charles S. Gowen, Charles H. Graham, Bernard R. Green, E. A. Greene, George Sears Greene, Stephen S. Haight, Robert L. Harris, William J. Haskins, C. W. Hazelton, Arthur Haviland, W. W. Hegeman, D. W. Hemming, Rudolph Hering, Clemens Herschel, George Hill, Francis L. Hills, S. W. Hoag, Jr., Henry W. Hodges, Arthur Hodges, Theodor Hoech, Sandford Horton, Edward W. Howe, Charles Warren Hunt, Washington Jones, George A. Just, W. J. Karner, Walter Katté, H. C. Keith, William D. Kelley, George A. Kimball, C. C. King, Paul S. King, J. M. Knap, R. W. Lesley, G. Leverich, F. B. Locke, Horace Loomis, Thomas D. Lovett, D. Jones Lucas, James L. Lusk, Charles Macdonald, C. C. Martin, O. J. Marstrand, Thomas H. McCann, W. E. McClintock, D. E. McComb, James C. McGuire, T. H. McKenzie, T. J. McMin, William Metcalf, Aug. Mordecai, Henry G. Morse, F. Nearing, R. E. Neumeyer, Charles E. Newham, O. F. Nichols, Edward P. North, Ellis B. Noyes, A. S. Nye, Jr., E. E. Olcott, George R. Olney, L. F. Olney, S. B. Opdyke, Jr., John F. O'Rourke, Joseph O. Osgood, James Owen, Charles Paine, A. McC. Parker, George W. Parsons, W. Barclay Parsons, J. M. Porter, James C. Post, Alexander Potter, H. W. Potter, Robert J. Pratt, William A. Pratt, Henry G. Prout, Charles Walker Raymond, Benjamin Reece, Joseph R. Richards, Palmer C. Ricketts, Percival Roberts, Jr., William Roberts, John C. L. Rogge, George M. Rusling, E. S. Safford, R. Schermerhorn, C. C. Schneider, Henry B. Seaman, W. W. Seitzinger, Ira A. Shaler, George F. Simpson, Frank W. Skinner, C. W. Smith, Maxwell Smith, Merritt H. Smith, E. G. Spilsbury, Frederic P. Stearns, H. E. Stevens, Waterman Stone, A. A. Stuart, W. H. G. Temple, S. C. Thompson, John Thomson, George H. Thomson, J. Kennard Thomson, Marshall M. Tidd, George C. Tingley, S. E. Tinkham, A. T. Tomlinson, Stevenson Towle, Henry R. Towne, E. E. R. Tratman, John C. Trautwine, Jr., W. G. Triest, E. K. Turner, John G. Van Horne, J. A. L. Waddell, John C. Wait, C. D. Ward, R. Willard Ware, William Watson, Albert L. Webster, E. Wegmann, Jr., Samuel C. Weiskopf, E. B. Weston, Samuel Whinery, Thomas D. Whistler, Frank O. Whitney, William H. Wiley, C. W. S. Wilson, Joseph M. Wilson, J. K. Wilkes, William E. Worthen and H. W. York.

OF THE BOARD OF DIRECTION.

JANUARY 2D, 1894.—The Board met at 20 o'clock. Ten members present.

The resignations of three Members, one Associate member and four Juniors were presented and accepted.

A petition signed by 19 members of various grades, requesting that the Library be opened and lighted every Wednesday evening, was considered, and the request was granted for the first quarter of 1894.

The Annual Report of the Board was considered.

One Associate and six Juniors were elected.

Applications for membership were considered and routine business transacted.

Adjournment was taken to January 12th, 1894.

JANUARY 12TH, 1894 (*Adjourned Meeting*).—Eleven members present. The report of William B. Jaudon, Expert Accountant, certifying to the accuracy of the accounts of the Society, was presented and accepted.

Action was taken in regard to Members in arrears for dues.

The following resolution was passed:

Resolved, That the names of all references given by applicants shall be published in the Blue List, but not in the Ballot for Membership, and that the following words—

“The fact that applicants give the names of certain members as references does not necessarily mean that the members so referred to endorse the applicant for admission to the Society, or to the grade of membership applied for,”

be published at the head of the Blue List.

The Report of the Board was adopted and ordered printed for presentation to the Society at the Annual Meeting.

Adjournment was taken to January 17th, 1894.

JANUARY 17TH, 1894, 12.30 O'CLOCK (*Adjourned Meeting*).—Fourteen members present. Routine business was transacted.

A committee was appointed to consider and present to the adjourned Annual Meeting the question of the proper presentation of reports of Special Committees to the Society.

Adjourned subject to the call of the Chair.

JANUARY 17TH, 1894, 21 O'CLOCK.—Fifteen members present.

Sir Casimir S. Gzowski, M. Am. Soc. C. E., was elected a Director to fill the vacancy created by the election of Colonel William P. Craig-hill to the Presidency.

Charles Warren Hunt, M. Am. Soc. C. E., was unanimously re-elected Assistant Secretary.

Thomas B. Lee was unanimously re-elected Auditor.

Committees on Finance, Library, Publications and Membership were appointed.

Routine business was transacted.

REPORT OF THE BOARD OF DIRECTION FOR THE YEAR ENDING DECEMBER 31st, 1893.

PRESENTED AT THE ANNUAL MEETING JANUARY 17th, 1894.

The Board of Direction, in compliance with the provision of the Constitution of the Society, presents its Report for the year ending December 31st, 1893.

MEMBERSHIP.

The changes in membership are fully shown in the following table:

	JAN. 1, 1893.			JAN. 1, 1894.			LOSSES.				ADDI- TIONS.		TOTALS.	
	Resident.	Non-resident.	Total.	Resident.	Non-resident.	Total.	By Transfer.	By Resignation.	Dropped.	By Death.	By Transfer.	By Election.	Loss.	Gain.
Honorary Members.....	6	2	8	6	2	8	..	..	..	1	*1	1	1	2
Corresponding Members.....	..	3	3	..	3	3	..	..	..	..	..	..	..	..
Members	194	940	1 134	208	964	1 172	1	6	13	13	†10	61	33	71
Associate Members.....	20	89	109	37	109	146	4	1	..	1	††9	34	6	43
Associates.....	22	47	68	21	47	68	..	2	1	1	..	3	4	3
Juniors.....	74	164	238	80	173	253	15	7	4	1	..	42	27	42
Fellows.....	14	34	48	15	32	47	..	..	..	2	..	1	2	1
Subscribers.....	8	27	35	10	25	35	..	..	..	..	..	..	..	..
Totals	338	1 306	1 644	377	1 356	1 733	20	16	18	19	20	142	73	162

* Member.

† 4 Associate Members and 6 Juniors.

†† Juniors.

It will be seen by the table that the net increase during the year has been 89.

Applications for membership have been acted upon by the Board during the year as follows:

Passed to Ballot as Member.....	70
“ “ Assoc. Member.....	48
Elected Honorary Members.....	2
“ Associate.....	1
“ Juniors.....	48
“ Fellow.....	1

Total.....	170
Awaiting action.....	24

The losses by death during the year have been one Honorary Member: William C. Young; twelve Members: Thomas Mutter Cleemann, Ernest Victor Clemens, Wendell Rhodes Curtis, Patrick John Flynn, Charles Roberts Johnson, Augustus Woodbury Locke, Robert Kirkwood Martin, Joseph Dilwyn Potts, William Scherzer, David Lowber Smith, Cook Talcott, William Williams Walker; one Associate Member: William Watmough Thayer; one Associate: Joseph W. Putnam; one Junior: Alfred Burnham Ellsworth; and two Fellows: Dennis Long and Frederick Aaron Lovecraft.

LIBRARY.

The expenditures upon the library for the past year have been as follows:

Binding 68 volumes.....	\$95 40
Twelve books purchased	41 60
Contingent expenses	27 52
Total.....	\$164 52

The additions to the library from all sources have been—

Bound volumes.....	167
Unbound volumes.....	182
Pamphlets.....	315
Maps.....	76
Photographs and lithographs.....	26
Specifications.....	141
Total.....	907

An accession book has been kept regularly in which every addition to the library has been entered. The present number of books, pamphlets, etc., in the library is 17 886. In addition a large number of pamphlets and maps still remain to be catalogued and entered.

DONATIONS.

Attention is again called to the fact, that the growth of the library is largely dependent upon legacies and contributions of reports and other engineering literature from members and from others who take an interest in the Society's welfare.

SOCIETY HOUSE.

The expenditures upon the Society House for repairs and betterments have amounted during the year to \$202 19.

The healthy life of the Society is largely dependent upon the maintenance of general interest in its meetings, and this cannot be secured without adequate accommodations for the comfort of those who attend these meetings and take part in the discussions. The seating capacity of the room is only about 80. On many recent occasions the attendance has been over 100, and at times much greater. Non-resident members have been present in considerable numbers, and their visits to New York are often arranged so that they may attend the meetings. In the opinion of the Board every practicable measure should be taken to promote this feature of the Society work.

The importance of securing larger accommodations in the near future cannot be overestimated. Moreover, the library space is rapidly being filled, and the desirability of a fireproof building for the security of the valuable books that are being rapidly accumulated is becoming more and more urgent. There is at present no convenient space for the arrangement and display of objects sent to the museum, or for collections of photographs and plates.

At the special request of many members the Board has decided to open the rooms on every Wednesday evening during the first quarter of the year, in order to afford opportunity for those who desire to consult the library and are unable to do so during the day. If the experiment proves a success, it will be continued.

PUBLICATIONS.

Nineteen numbers of the *Bulletin* were issued during the year, and 1 800 copies were printed of each number.

The List of Members is in print, but its issue has been deferred until after this Annual Meeting, so that hereafter the list will contain the record up to the time of the Annual Meeting, and the list of officers for the then current year. The alphabetical list of members introduced last year has proved a great convenience, and it will be continued in future issues.

Monthly numbers of the *Transactions* and *Proceedings* have been printed during the year 1893. Those from January to June, inclusive, contain the papers presented at the ordinary meetings, and the discussions received upon them, up to the summer vacation, together with all the Convention Proceedings; 2 200 copies were printed of each monthly number. This left the numbers for the last six months of the year free for the publication of the papers from the Engineering Congress; 2 500 of each have been printed, and as the matter has all been stereotyped, additional copies can be printed should they be required.

The following table gives a summary of the number of pages, plates and cuts printed during the year.

	Number of Pages.	Number of Plates.	Number of Cuts.
Transactions.....	1 921	220	87
Proceedings.....	200		
Bulletins.....	79		
Indexes and Tables of Contents,	113		
Reprints.....	48		
Constitution and List of Mem- bers.....	164		
Total.....	2 525		

The 220 plates published are equivalent to 526 pages of the *Transactions*.

The cost of publications has been as follows:

For Paper, Printing and Binding <i>Transactions</i> and <i>Proceedings</i> , including 10 275 Advance Copies of Papers.....	\$9 448 37
For Plates and Cuts, Drafting, Reproducing and Inserting.	4 791 79
For 19 <i>Bulletins</i>	231 22
For Paper, Printing and Binding 2 400 Copies of List of Members.....	650 59
For 1 450 Extra Copies of Memoirs.....	82 22
For 11 125 Extra Copies of Papers.....	1 311 12
For Printing 2 200 copies of Index of Vols. XXII to XXVII, inclusive.....	214 08
For Reprinting 500 each of one back Number of <i>Transactions</i> and one Paper.....	139 14
For time of Officers, Clerks and Stenographers charged to Publications.....	2 812 00
For Copyright.....	8 00
For Sundry expenses charged to Publications.....	167 72
For Commissions on Advertisements.....	571 80
	<hr/> \$20 428 05
Deduct amount received for Advertisements.....	\$2 279 50
Deduct amount received for sales of papers, etc.	1 658 39
	<hr/> 3 937 89
Net cost of Publications.....	<hr/> \$16 490 16

POSTAL RATES.

In November, 1893, the Post Office Department revoked the second-class postal rate as applied to the *Transactions* of the Society. This resulted in a considerable increase in the item of postage. The postage on publications during the past year amounted to \$1 310 81.

THE ENGINEERING CONGRESS.

In the last annual report the Board gave a résumé of the arrangements respecting the Congress, in so far as they were completed up to January, 1893. In response to the invitations to prepare papers for the Civil Engineering Division (of which the Society had accepted charge) about 140 favorable replies were received. Those who promised papers were notified that, if possible, papers should be in the Secretary's hands by January 15th. Few papers were received before April, and some were not received until about the time of the meeting of the Congress.

Fifty papers were accepted and presented, in printed form, to the Congress, containing 1 155 pages, with 129 plates and 70 cuts. These papers were furnished from the following countries :

Germany.....	16
Mexico.....	4
Portugal.....	3
Holland.....	2
France.....	2
England.....	2
South America.....	1
Nova Scotia.....	1
Australia.....	1
United States.....	18
Total.....	50

A number of additional papers were received too late for presentation to the Congress, of which three have been published in the *Transactions*.

Papers written in a foreign language were translated by Members of the Society, effecting a large saving in expense, and securing the best results.

The papers, together with the discussions, will make two large volumes. Bound copies will be sent to each Society invited to participate in the Congress, and to each author who presented a paper.

There were registered in the Civil Engineering Division, 207 Members of the Society, 76 visitors from the United States, and 65 foreign visitors and delegates, in all 348. The attendance at its meetings was large and the interest was well sustained.

A large number of foreign engineers were expected to pass through New York on their way to the World's Fair, and it seemed to the Board desirable that something should be done to make them welcome, and aid them by giving information as to matters of engineering interest, and assisting them to obtain access to important works throughout the country.

Early in the year the Board was informed, that contrary to what it had been led to expect, the World's Congress Auxiliary would have no funds available for the publication of papers.

Voluntary subscriptions were therefore asked from the Members for these two objects, and in response to the several circulars issued, the sum of \$8 716 17 was received. By deferring the publication of the papers read at the ordinary meetings during the last half of 1893, until the year 1894, this sum has enabled the Board to meet the heavy expenses incurred in connection with the Congress.

An additional amount of \$3 000, requested from the Society by the General Committee of the Engineering Societies for the purpose of maintaining an engineering headquarters at Chicago, was subscribed by members and paid to that Committee.

One company of foreign engineers visited this country in a body, comprising 48 members of the Société des Ingenieurs Civils. They were entertained while in New York by representatives from each of the principal engineering societies. The expense was borne by the engineers of this country who visited Europe in 1889, as a return for the courtesies then received.

COMMITTEE ON INFORMATION AND COURTESY.

A Committee on Information and Courtesy, consisting of Messrs. Edward P. North, L. L. Buck and Foster Crowell, was appointed by the Board to welcome visiting engineers and give them information. The work of the Committee as described in full in its report has been heartily commended (see page 36).

SOCIETY BADGE.

Acting under the resolution adopted at the last annual meeting, the Board of Direction, through a sub-committee, has canvassed the Society for the purpose of ascertaining the views of all members on the subject of changing the badge of the Society. The report of this sub-committee will be found appended hereto (see page 37).

CODE OF ETHICS.

The question of the adoption by the Society of a Code of Ethics came before the Annual Convention in a report from the Board of Direction to which the subject was referred by the last Annual Meeting. The report presented arguments for and against the appointment of a committee on the subject, and was accompanied by a recommendation that such committee be not appointed.

A resolution to refer the question of the appointment of a committee to letter ballot by the Society was defeated by a vote of 11 in the affirmative and 54 in the negative.

MEETINGS.

During the year beginning January 1st, 1893, 21 meetings of the Society (excluding the meetings of the Congress) have been held, one of which was the Annual Meeting in New York on January 18th and 19th, and one was the Annual Convention at Chicago. At these meetings 21 papers were read, and were discussed either orally or in writing by 133 members and others.

The Norman Medal for 1892 was awarded to William Starling, M. Am. Soc. C. E., for the paper on "Some Notes on the Holland Dikes."

The Rowland Prize for 1892 was awarded to Samuel M. Rowe, M. Am. Soc. C. E.; Stillman W. Robinson, M. Am. Soc. C. E., and Henry H. Quimby, M. Am. Soc. C. E., for their paper on "The Red Rock Cantilever Bridge."

In closing this report the Board takes great pleasure in congratulating the Society on passing so successfully through this important year in its history without incurring debt.

The reports of the Treasurer, Auditor and Finance Committee are appended.

By order of the Board of Direction,
F. COLLINGWOOD,
Secretary.

REPORT OF THE TREASURER

FOR THE YEAR ENDING DECEMBER 31ST, 1893.

Balance on hand December 31st, 1892.....	\$3 008 74	
Receipts, January 1st to December 31st, 1893 ..	42 212 46	
Payments of audited vouchers, January 1st to December 31st, 1893.....		\$41 030 07
Balance on hand, December 31st, 1893 :		
In Bank and Trust Company....	\$3 691 13	
In hands of Secretary.....	500 00	
		<u>4 191 13</u>
	<u>\$45 221 20</u>	<u>\$45 221 20</u>

The securities on hand are as follows :

One Chicago and North Western Railway Bond, 4%, coupon, par value	\$1 000
Seven Pennsylvania Railroad General Mortgage Bonds, 6%, registered, par value.....	7 000
Four Pennsylvania Railroad General Mortgage Bonds, 6%, coupon, par value	4 000
One Rio Grande Western Railway Bond, 4%, coupon, par value.....	1 000
One Pittsburgh and Western Railway Bond, 4%, coupon, par value	1 000
One Certificate Croton Aqueduct Stock of the City of New York, 7%, registered, par value.....	1 000
Ten Shares Stock Consolidated Gas Company of the City of New York, par value	1 000

Respectfully submitted,

JOHN BOGART,
Treasurer.

REPORT OF THE AUDITOR FOR THE

TO THE BOARD OF DIRECTION OF THE

GENTLEMEN,—I have the honor to present the following statement beginning January 1st, 1893.

RECEIPTS.

Balance on hand December 31st, 1892.....	\$3 008 74
Entrance Fees.....	\$3 285 00
Current Dues.....	18 927 67
Past Dues.....	828 04
Subscriptions for the Engineering Congress.....	8 716 17
Dues for year beginning January 1st, 1894.....	4 290 95
Sales of Publications.....	1 658 39
Badges.....	515 00
Certificates of Membership.....	122 30
Advertisements.....	2 279 50
Interest:	
On Pennsylvania Railroad Bonds \$660 00	
On New York Croton Aqueduct	
Stock.....	70 00
On Chicago and North Western	
Railroad Bond.....	50 00
On Consolidated Gas Stock.....	75 00
On Pittsburgh and Western Rail-	
road Bond.....	40 00
On Rio Grande and Western	
Railroad Bond.....	40 00
On Union Trust Company De-	
posit.....	131 12
	<hr/>
	1 066 12
Compounding Dues.....	250 00
Fellowship Fees.....	250 00
Other sources.....	23 32
	<hr/>
	42 212 46

\$45 221 20

YEAR ENDING DECEMBER 31st, 1893.

AMERICAN SOCIETY OF CIVIL ENGINEERS.

of receipts and disbursements for the fiscal year of the Society,

DISBURSEMENTS.

Interest on Mortgage.....	\$800 00	
Taxes	418 60	
Stationery and Printing.....	1 258 30	
Postage	2 164 13	
Publications.....	20 428 05	
Engineering Congress (exclusive of Publications).	2 341 23	
Library	1 061 12	
Convention and Annual Meeting.....	1 663 17	
Janitor.....	720 00	
House Supplies and Furniture.....	210 62	
Fuel	268 78	
Water.....	17 00	
Gas	129 59	
Certificates of Membership	105 99	
Badges.....	495 00	
Work of Committees.....	296 34	
Safe Deposit.....	16 00	
Norman Medal and Rowland Prize	122 45	
Finance and Accounts.....	1 878 27	
Repairs and Betterments, Society House.....	202 19	
Other Expenditures.....	399 82	
Current Business.....	6 033 42	
		\$41 030 07
Balance in Bank and Trust Co. and in hands of Secretary.....		4 191 13

\$45 221 20

The compensation paid to each person in the service of the Society during the past year is stated below, and also the several accounts to which these payments have been distributed by the Finance Committee :

Francis Collingwood, Secretary.....	\$4 000 00	
Charged to Publications.....	\$364 00	
Current Business.....	3 127 67	
Work of Committees.....	92 00	
Convention and Annual Meeting..	230 00	
Engineering Congress.....	176 33	
Finance and Accounts.....	10 00	4 000 00
Charles Warren Hunt, Assistant Secretary and Librarian... \$2 500 00		
Charged to Publications.....	\$1 169 37	
Library	148 00	
Current Business.....	516 30	
Work of Committees.....	65 00	
Convention and Annual Meeting..	206 00	
Engineering Congress.....	104 33	
Finance and Accounts.....	291 00	2 500 00
John Bogart, Treasurer.		
Charged to Finance and Accounts.....	\$600 00	
Thomas B. Lee, Auditor and Chief Clerk.....	\$1 779 50	
Charged to Publications.....	\$313 00	
Current Business.....	584 67	
Work of Committees.....	1 00	
Convention and Annual Meeting..	98 83	
Engineering Congress.....	50 00	
Finance and Accounts.....	732 00	1 779 50
M. T. Jefferis, Assistant Librarian.....	\$1 210 00	
Charged to Library.....	\$745 00	
Publications.....	456 00	
Current Business.....	8 00	
Convention and Annual Meeting..	1 00	1 210 00
B. J. Burke, Clerk.....	\$1 083 96	
Charged to Publications.....	\$144 00	
Current Business.....	793 96	
Convention and Annual Meeting..	89 00	
Engineering Congress.....	55 00	
Finance and Accounts.....	2 00	1 083 96

JANUARY PROCEEDINGS.

33

D. J. Mullen, Stenographer and Typewriter.....		\$585 00
Charged to Publications.....	\$45 00	
Current Business.....	485 00	
Engineering Congress.....	45 00	
Work of Committees.....	5 00	
Convention and Annual Meeting..	5 00	585 00
R. J. Dunn, Stenographer and Typewriter.....		\$165 00
Charged to Publications.....	\$15 00	
Current Business.....	65 00	
Engineering Congress.....	55 00	
Work of Committees.....	20 00	
Convention and Annual Meeting..	10 00	165 00
E. G. Crans, Stenographic Reporter.....		\$425 51
Charged to Publications.....	216 62	
Work of Committees.....	38 44	
Convention and Annual Meeting..	38 20	
Engineering Congress.....	132 25	425 51
A. C. Mander, Janitor.....		
Charged to Janitor.....		\$720 00
John J. Bower, Office Boy.....		\$269 50
Charged to Publications.....	\$84 00	
Convention and Annual Meeting..	16 50	
Current Business.....	164 00	
Engineering Congress.....	5 00	269 50
F. Day, Temporary Stenographer and Typewriter.....		\$256 67
Charged to Engineering Congress.....	\$215 00	
Current Business.....	36 67	
Publications.....	5 00	256 67
Total compensation paid.....		\$13 595 14

DISTRIBUTION OF TOTAL COMPENSATION PAID.

Publications.....	\$2 811 99
Library.....	893 00
Janitor.....	720 00
Finance and Accounts.....	1 635 00
Work of Committees.....	221 44
Convention and Annual Meeting.....	694 53
Engineering Congress.....	837 91
Current Business.....	5 781 27
Total.....	\$13 595 14

The Funds of the Society are as follows :

Fellowship Fund :

Ninety-seven subscriptions to December 31st, 1892.....	\$10 900 00
Premium and accumulated interest, December 31st, 1892.....	1 388 28
Fund on hand December 31st, 1892	\$12 288 28
One subscription received during 1893.....	250 00
Interest received during 1893.....	598 00
	<u>\$13 136 28</u>
Expended for Publications during 1893.....	598 00
Total amount in this Fund, December 31st, 1893...	<u><u>\$12 538 28</u></u>

The present investment of this Fund is :

Nine Pennsylvania Railroad General Mortgage Bonds, cost.....	\$11 111 82
One Chicago and North Western Railroad Bond, 5%, cost.....	1 035 00
Part of one Rio Grande Western Railroad Bond, 4% (balance of this Bond in Compounding Fund).....	391 46
	<u>\$12 538 28</u>

Compounding Fund :

Four payments at \$325.....	\$1 300 00
Nine payments at \$250	2 250 00
	<u>\$3 550 00</u>

The present investment of this Fund is :

One Pennsylvania Railroad General Mortgage Bond, 6%, cost	\$1 222 50
Ten shares Consolidated Gas Company of New York, cost.....	972 50
One Pittsburgh and Western Railroad, 4%, cost.....	818 75
Part of one Rio Grande Western Railroad Bond (balance of this Bond in Fellowship Fund).....	382 29
Cash	153 96
	<u>3 550 00</u>
Carried forward.....	<u>\$16 088 28</u>

Brought forward.....\$16 088 28

Norman Medal Fund :

One Certificate Croton Aqueduct Stock, New York
City..... 1 000 00

Rowland Prize Fund :

One Pennsylvania Railroad General Mortgage Bond,
6%, cost..... 1 222 50

Total investments.....\$18 310 78

Respectfully submitted,

THOMAS B. LEE,
Auditor.

REPORT OF THE FINANCE COMMITTEE.

The Finance Committee report that they have performed the duty of auditing all the bills which have been paid during the past year, and have found that each bill has been charged to its proper account.

They have also seen that the investments, transfers and deposits have been made as detailed in the reports of the Auditor and Treasurer.

In accordance with the provisions of the constitution, the accounts and financial books of the Society have been examined and found correct by an expert accountant.

CHAS. B. BRUSH,
CHAS. MACDONALD,
L. L. BUCK,
S. WHINERY,
WM. P. CRAIGHILL,

Committee on Finance.

REPORT OF THE COMMITTEE ON INFORMATION AND COURTESY.

To the Board of Direction of the American Society of Civil Engineers :

The Committee on Information and Courtesy, having completed its labors, respectfully presents its final report and asks to be discharged.

In its preliminary report the Committee had estimated that its work would involve the expenditure of \$2 500. The Board of Direction, deeming, as expressed in its action, that the special subscription fund for this and other extraordinary expenses of the Columbian Exposition year would not justify such a large outlay, made a provisional appropriation of \$1 200, out of which the Committee has expended \$1 140 85, all bills being paid, leaving an undrawn balance of \$59 15, as per Auditor's statement appended.

Postage.....	\$107 95
Typewriter and stenographer.....	197 00
Printing and binding, maps, etc.....	821 90
Stationery.....	2 00
Telegrams and express charges, etc.....	12 00
	\$1 140 85

It was only by the co-operation of the executive staff of the Society that it was possible to so limit the expense, and the Committee takes this occasion to express its recognition of the service. The Society, has not, however, been put to any additional office expense, all expenses of every nature being included in the above-mentioned sum. The credit for the formation and plan of work of this Committee is due to the honored President of the Society, Mr. William Metcalf, who, as Chairman of a Provisional Committee, took an active part in the preliminary organization.

The Committee began its work by corresponding with the foreign engineering societies, advising them of its purposes and offering its services to their members who might visit this country during the time of the Columbian Exposition; also, with the local engineering associations throughout the United States, with every individual member of our own Society, and a large number of representative engineers, corporations and manufacturers, inviting co-operation in securing ample opportunities and facilities for properly accredited visiting engineers to examine engineering structures, industries, railroads, mines and other objects of technical interest. The response was very general and hearty and the Committee was thus enabled to issue effective introductions to every class of work of interest to engineers. Eighty-five foreign societies, 31 local associations and 262 representative establishments were thus brought into relation, besides all our own membership.

In order to enable visitors not familiar with our country and the wide distribution of its industries to make a satisfactory selection of localities and the most expeditious ways of reaching them, the Committee prepared a comprehensive reference map of the United States, British possessions, and a part of Mexico, showing all principal towns and railroads; also, lists of typical engineering works, mines and industrial establishments, represented by its correspondents, the lists

and maps being so connected by a system of reference that the situation of any work could be located at a glance. This information together with the names of local representatives and other facts of interest was published in the form of a convenient pocketbook, bearing the imprint of our Society, a list of our officers for 1893, etc., and issued in its name. A copy of the book is herewith offered as a part of this report.

The reference map was distributed to all engineers who applied for it, to every foreign and local engineering society, to individuals or corporations who had participated in the work; and, in response to a general demand, a copy was subsequently sent to every member of the Society.

All properly accredited applicants received official cards of introduction (a copy of which is appended); detailed information was also freely given.

The Committee has reason to think that the results were completely satisfactory to those who availed themselves of its organization. It is a source of some disappointment in all quarters that the total number of foreign visitors to the Exposition turned out to be so much smaller than was expected, and this was true in regard to the engineers; but on the other hand it is a matter for congratulation that the arrangements of this Committee were elastic and did not involve a disproportionate expense.

At the time of the visit of the French Society of Civil Engineers the members of the Committee individually gave what assistance they could to the local reception committees, although the Society as a body took no active part; and in every way possible then, as at all other times, endeavored to carry out the spirit of the Society and manifest its interest in the welfare and comfort of the visitors.

The many acknowledgments made by visiting engineers of the aid derived from the reference map and our introductions lead your Committee to suggest that this work, revised from time to time, might be continued under the direction of the officers of the Society with great advantage to our own members, as well as to members of foreign societies visiting this country in the future. If the engineering and technical societies of other countries should co-operate with us and extend like courtesies to us and to one another, it would result in great convenience to all members of the profession.

Several hundred copies of the map are still in hand at the Society House, and the special map plates are the property of the Society.

EDWARD P. NORTH,
L. L. BUCK,
FOSTER CROWELL,
Committee.

REPORT OF COMMITTEE ON BADGE.

The Society at its business meeting of the Convention of 1892, at Fortress Monroe, requested the Board of Direction to consider and report recommendations in relation to the badge of the Society.

At the January, 1893, meeting, the Board of Direction made a brief report recommending a canvass of the Society through the medium of a suitable interrogatory circular.

This recommendation was adopted by the Society, and on June 2d the undersigned were continued a committee to carry this canvass into execution. We now submit the following report.

A circular was prepared and sent out to the members on September 12th, 1893, asking for answers to four questions, as follows:

1. Do you own a badge?
2. Do you approve of the present design?
3. Do you think an effort should be made to procure a new design?
4. If a design can be secured which proves to be generally satisfactory, will you be likely to purchase one?

At the time the circular was sent out there were 1,300 members entitled to vote.

The Committee have received 560 ballots and 71 letters, 43 of which contained no ballot.

Of the 560 ballots, 407 have voted yes or no, 94 have been interpreted, and 59 are so uncertain or indifferent that it has been impossible for the Committee to form any idea of the desires of those who sent these ballots.

Of the 501 votes counted, 321 own badges, and 180 do not.

In answer to the second question sent out by the Committee 175 like the present design, 314 do not like it, and there are 12 blanks.

In answer to the third question, 287 think a new design should be secured, and 188 do not think so, and there are 26 blank ballots.

In answer to the fourth question, 381 will purchase a new design, 106 will not, and 14 ballots are blank.

Of the 59 uncertain ballots 34 own badges, 25 do not, and 20 like the design in present use; 18 do not like it, and 21 have either never seen it or are indifferent.

Of the 71 letters, 28 have been included as ballots in the above list, 1 has no opinion to express, and 42 have been interpreted to vote as follows:

- 26 own badges.
- 16 do not.
- 15 like the present design.
- 26 do not.
- 1 blank.
- 16 think a new design should be secured.
- 26 are of the contrary opinion.
- 29 would purchase a new badge.
- 12 would not purchase a new badge.
- 1 blank.

If these last votes be added to the plain ballots, we have the following general expression on the part of the Society:

Whole number of votes.....	602	
Number who own badges.....	381	} 602 first question.
“ “ do not own badges.....	221	
“ “ like present badge.....	210	} 602 second question.
“ “ do not like present badge	358	
“ “ have either never seen it or are indifferent.....	21	
“ of blank votes.....	13	
“ who are in favor of new design	303	} 602 third question.
“ “ are opposed to new design	214	
“ “ have cast blank ballots..	26	
“ “ are indifferent.....	59	

Number who will buy a new badge...	410	} 602 fourth question.
“ “ will not buy a new badge	118	
“ of blank ballots.....	15	
“ indifferent.....	59	

ANALYSIS OF SUGGESTIONS RECEIVED.

In the letters received by the Committee, 13 think the badge had better be left as it is, for the sake of uniformity; 5 suggest either the letters A. S. C. E. or a monogram; 3 agree that the level is not a good emblem; 2 hope for some other design; 10 do not believe in badges at all; 1 suggests an exchange of new and old badges; 2 suggest a lever; 1, that a new badge should be in the shape of a scarf-pin; 1, that it should be suitable for a watch-charm; 2, that new design should be in form of a button; 4, that a new design should be left either to jewelers or other skilled designers; 1, a bar in the shape of a lever with globe, for the watch chain; 5 are satisfied with present design; 1 suggests heraldic devices; 1, an Egyptian pyramid; 2 suggest light-houses; 2, a sphere inside of triangle; 1, a figure engaged in shaping a new world; 1, Ericson's *Monitor*; 1, a medallion of some prominent member; 1, a compass, worn with the watch; 1, "*Droit et avant*"; 1 would take off level and substitute what Archimedes had engraved on his tombstone, viz., a sphere inscribed in a cylinder whose diameter and height was equal to the diameter of the sphere.

Several designs have been received by the Committee, but only a few drawn with any care. As a matter of drawing the best design was from Messrs. C. D. Purdon and J. Fred. Temple. It represents a bar for the watch chain and is in the shape of a lever holding up a globe.

Another member, William Starling, has suggested a somewhat similar design, as follows: "A globe in gold on present shield, with Archimedes saying in Greek letters, 'Give me where to stand and I will move the world.'—A. S. C. E. 1852."

A drawing accompanies this design, and it represents the globe with the motto in Greek surrounding it, taking the place of the present level on the present shield. The letters and date are added below.

Miller A. Smith, assisted by Mr. Wilkinson, sends 9 very neat designs, principally in the form of monograms.

Another member suggests "as to form, a circular gold vest pin coat button or watch charm, about $\frac{3}{4}$ in. outside diameter. As a theme, on the right hand, on a blue enameled field, a silver heraldic castle, behind which is seen a golden bridge of ancient form, and above it on the left a gold sun, the whole surrounded by a silver ribbon with a buckle. On the buckle the letters M, F, A or J, in gold, indicating that the owner is a Member, Fellow, Associate or Junior. On the ribbon itself, in gold, the words 'American Society Civil Engineers.'"

One member made the very excellent suggestion that the maker should not be allowed to stamp his name as an advertisement on the backs of the present badges, as is now done, and the committee have already taken steps to have this practice stopped.

The Committee find that 994 badges have been purchased by members of the Society.

DESMOND FITZGERALD.
WM. P. CRAIGHILL.
JOHN THOMSON,
Committee.

DECEMBER 28TH, 1893.

REPORT ON THE AWARD OF THE NORMAN MEDAL—1892-93.

The Board of Censors appointed to award the Norman Medal for papers published in the Society's *Transactions* during the year terminating August 1st, 1893, beg to report that they award the medal to Desmond FitzGerald, M. Am. Soc. C. E., for paper No. 547, entitled "Rainfall, Flow of Streams and Storage."

Respectfully submitted.

SAMUEL REA, *Chairman.*
C. L. STROBEL,
E. T. D. MYERS.

REPORT ON THE AWARD OF THE ROWLAND PRIZE—1892-93.

The Committee to award the Rowland Prize for papers published in the Society's *Transactions* during the year ending August 1st, 1893, beg to report that they award the prize to paper No. 610, on "The Improvement of Harbors on the South Atlantic Coast of the United States," by William M. Black, M. Am. Soc. C. E.

(Signed.)

A. FTELEY,
PERCIVAL ROBERTS, Jr.,
F. COLLINGWOOD,
Committee.

REPORT OF THE COMMITTEE ON STANDARD TIME.*

The modern system of reckoning time so long and so effectively advocated by the American Society of Civil Engineers is making good progress in the island-continent of Australia. It has been taken up by various institutions in the principal cities and by prominent individuals, and by them brought to the attention of the governments of New South Wales, Queensland, Australia, Victoria, Western Australia, Tasmania and New Zealand.

A conference of gentlemen representing these governments was held in Brisbane in March last, when the subject was discussed at length and a resolution unanimously passed favoring the adoption of the Hour-zone system. Since this, the movement has progressed a step farther, the Premier of Queensland having addressed communications to the other governments, urging the adoption of the system. Assurances are given that the new system will be successfully inaugurated in Australia at the beginning of the new year. It will be known to many that in India the 24-hour notation has been in universal use on the rail-

*This report is condensed by the Secretary from several letters written him by the Chairman, dated "At Sea, on the Indian Ocean," Ceylon and London.

ways within the Empire for several years, and gives the utmost satisfaction, as it cannot fail to do wherever the authorities have the good sense to bring it into use.

The following notice is from the *Overland Mail* of November 3d:

“STANDARD TIME FOR CENTRAL EUROPE.—A new standard time came into operation on October 31st: At Rome time has hitherto been reckoned 50 minutes before Greenwich, but now the difference will be one hour, and the clock will strike twelve ten minutes earlier. As regards time, the countries of Europe will now be divided into three groups: That of the West—England, France, Spain and Portugal—who take their time from Greenwich; the central group—Sweden, Norway, Denmark, Germany, Austria-Hungary, Switzerland and Italy—whose time is an hour later; and finally the Oriental group—Russia, Turkey, the Balkan States and Greece—whose time is two hours ahead of Greenwich.”

Sir Robert S. Ball, LL.D., F. R. S., former president of the British Association for the Advancement of Science, also Astronomer Royal for Ireland, refers in a recent article in the *Graphic* to the results achieved all over the world in this movement, in which the American Society of Civil Engineers has taken a prominent part.

The Astronomer Royal at Greenwich, in a recent letter to the Chairman, writes:

“We have heard from sources that can be relied on, that since November 1st last, the time used on the Italian railways is exactly one hour fast on the prime meridian, and that the hours are counted from 0 to 24, midnight being the hour 0. With regard to other continental countries, the present state of things is as follows: Belgium and Holland use the time of the first meridian; this was made legal in Belgium on May 1st, 1892.

“Central European time, one hour fast, was adopted as the legal time in Germany, on April 1st, 1893. A bill for its introduction into Austria-Hungary has been brought before the Austrian Parliament. The Swiss Federal Assembly has authorized the use of this time in Switzerland, and we believe it is in use there.”

Another letter from the Astronomer Royal states:

“The Swiss Federal Council has given instructions for the adoption of the mid-European time in Switzerland for postal telegraph and railway purposes, from the 1st of June, 1894. Mid-European time has been in use throughout Denmark since January 1st, 1894.”

The Chairman of the Committee also encloses a letter (given in full below) from Mr. H. H. Spiller, who took part in the Railway Conference in Berlin, three years ago, when the whole question of time-reckoning in Europe was dealt with. In reference to this letter, he writes: “The most striking part of this letter is the reference to the adoption of the 24-hour notation throughout Italy, where it is actually in use on all the railways in that country. I have a book of time-tables before me, consisting of 96 pages, by which it appears that since December 16th last, the 24-hour notation has been in use in that country. This is no doubt the entering wedge for Europe. The 24-hour notation is now perma-

nently in use in important sections of Asia, Europe and North America. I hope soon to see it adopted in Australia, and I confidently trust that before many years its use will become general."

"SANDFORD FLEMING, Esq.,

"Hotel Windsor,

"Victoria St.,

"Westminster, S. W.

"JANUARY 5TH, 1894.

"MY DEAR SIR:

"In reply to your favor of the 3d inst. (received this morning), on the subject of the time in use on the Italian railways, I beg to say that your information is quite correct. The arrangement, only recently put in force in Italy, forms part of an arrangement arrived at at an International Railway Conference in Berlin, held on the 14th and 15th January, 1891, in which I took part. It was then proposed that a 'zone' system of time should be adopted for the railways of Central Europe, and this was accepted by Germany (North and South), with Alsace-Lorraine, including the Scandinavian kingdoms, Switzerland, Italy, Austria, and Hungary, each country reserving to itself the right of fixing the date when the system should come into force. Up to the present moment, so far as we know here, it has only been acted upon by Sweden, Germany (North and South), with Alsace-Lorraine, Austria and Italy, the Swiss having announced their intention of commencing for the summer season. This arrangement formed the subject of a protocol which was signed by all the members present, including myself. Another result of this proposal was that Holland and Belgium adopted Greenwich time for the working of their railways, France making no change whatever; being, I suppose, disinclined to adopt either the English or German meridians. This 'Central European Time' is exactly one hour east of Greenwich (15°), and will shortly be in force throughout Central Europe, simplifying, in a very great degree, the time tables of the Through International Services.

"At this same conference I suggested that this would be a good opportunity of effecting a thorough reform in the time tables, by reckoning the hours from 1 to 24. This was thought too great a reform, and no notice was taken of it, but, when I recently was informed that the Italians were about to adopt the system agreed on, I was surprised to find that they intended also carrying out this idea of the 24 hours, which, indeed, had been in force in Italy in the ancient times, and is still used in some countries in the telegraph service. I send you an Italian timetable, which will enable you to see for yourself that this is the case. Here, in this business, we find that, in making up the sheet-bills for skeleton through routes, for distribution in this country, that the Italian hours are rather puzzling to people here, and we have thought it best to convert them to the old system, so that they might conform to that still in force with the French railways; but it would be certainly a very good thing if this 24-hours' system were adopted all over the world. The Germans seem to be satisfied that their plan of printing the night hours in heavier text answers every purpose, but, admirable as this system is, we find that printers are continually making mistakes, and the right description of text is not always employed, thus causing great confusion. I find that in those countries where the Greenwich and Central European meridians have been adopted within the last year or so, the local time is being also altered to the railway time, without any great inconvenience resulting therefrom. Of course, in the case of Stock-

holm, Berlin and Rome, the new time differs but a few minutes from the old. It is to be hoped that this principle will be carried out all round the world, so that differences in the times in use in different countries may only vary from hour to hour, without any fractions in minutes.

"Should you require any further information on this or any other subject, I shall always be happy to be of service.

"I am, dear sir,

"Yours faithfully,

"HY. H. SPILLER."

MEMOIRS OF DECEASED MEMBERS.

ROBERT KIRKWOOD MARTIN, M. Am. Soc. C. E.*

DIED NOVEMBER 24TH, 1893.

Mr. Martin was born at Denton, Caroline County, Md., January 5th, 1835. He began his career as a civil engineer at the age of eighteen, being engaged in August, 1853, as a rodman on the preliminary survey of the Alexandria, Loudon and Hampshire Railroad, near Romney, in Hampshire County, Va. He continued for five years upon railroad work, being in 1854 calculator on the same road on preliminary surveys in Jefferson, Clarke and Frederick counties, Virginia. In 1855-56 he was First Assistant Resident Engineer on the Norfolk and Petersburg Railway; in 1857 First Assistant Resident Engineer on the Sand-Patch Tunnel on the Pittsburgh and Connellsville Railroad. In 1858 he became connected with the construction of the Baltimore Water Works, in the subsequent development of which his deservedly high reputation as an engineer was most justly earned. His first appointment was as Resident Engineer on the introduction of the Jones Falls supply, in charge of half the conduit line, and the Hampden and Mount Royal reservoirs. In 1864 he began the construction of the storage reservoir (capacity, 493 000 000 galls.) known as Druid Lake, and situated in Druid Hill Park. In 1871 he was in charge of the construction of the High Service Reservoir, also in Druid Hill Park. At this time the late Charles P. Manning was the Chief Engineer of the Baltimore Water Works. During the same year (1871), it having been recognized that with the growth of the city the Jones Falls system could no longer be depended upon to supply the quantity

* Memoir prepared by Clayton C. Hall. Assoc. Am. Soc. C. E.

of water needed to meet the constantly increasing consumption, the introduction of water from the Gunpowder River was undertaken. Mr. Martin was placed in charge of what was called the temporary supply from that river, and constructed a pumping station upon the Gunpowder, by which water was pumped through a pipe line $3\frac{1}{2}$ miles in length across an intervening ridge to Roland Run, a tributary of Lake Roland, where this supply was utilized to make up the deficiency of the flow from Jones Falls. In 1876 Mr. Martin was Chief Engineer in charge of the introduction of the Gunpowder water and the construction of permanent works for that purpose. He had charge of the construction of Lock Raven upon the Gunpowder River (capacity, 510 000 000 galls.), and also of the subterranean aqueduct by which the water is conveyed thence to Lake Montebello (capacity, 500 000 000 galls.). This aqueduct, completed in 1881, is a tunnel 12 ft. in diameter and 7 miles in length. It is one of the three longest tunnels in the world, being exceeded in length only by two railway tunnels in Switzerland, the Mt. Cenis ($7\frac{1}{2}$ miles) and the St. Gothard ($9\frac{1}{2}$ miles). In addition to Lake Montebello, the neighboring Lake Clifton (capacity, 265 000 000 galls.) was built under Mr. Martin's direction. Upon the extension of the limits of the city of Baltimore, in 1888, it became necessary to provide a new High Service Reservoir in connection with the Gunpowder water supply, and this he also constructed. It is known as Guilford Reservoir.

In 1881 Mr. Martin was made Chief Engineer of the Baltimore City Water Works, and this position he held continuously up to the time of his death. He was also engineer of the water supplies of Norfolk, Va.; Hanover, Pa.; Hagerstown, Md.; Annapolis, Md.; Catonsville, Md., and the Maryland House of Correction. Mr. Martin's reputation as an engineer extended far beyond the limits of his own city and state, and he was consulted far and wide upon the subject of city water supplies, upon which he was a recognized authority. He had also tempting offers for professional employment much more lucrative than the position he held, but he uniformly declined them, preferring to devote himself to the completion of his life's work. In relation to the Baltimore City Water Works, recognized as among the most extensive and complete in the country, the words of the epitaph of Sir Christopher Wren, in St. Paul's Cathedral, in London, may be fitly applied to Mr. Martin, "*Si monumentum queris, circumspice.*"

Mr. Martin was married on December 14th, 1876, to Mrs. Krebs (née Balderson), who survives him. In personal character he was singularly modest and unassuming, and kindly and gentle in disposition. He was at the same time a strict disciplinarian, and ably directed the large forces of workmen employed under him. No higher evidence of the esteem in which he was held could be found than the fact that in a city in which no civil service rules have at any time obtained he held a most

important and responsible office for 35 consecutive years, under a municipal government from which he frequently, perhaps generally, differed in political opinion.

Mr. Martin's death occurred November 24th, 1893. He went to his office in the City Hall at his accustomed hour, half-past nine o'clock in the morning, apparently in his usual health. After ascending by the elevator, he stopped for a moment in the corridor to purchase a ticket for some charitable entertainment from one of the char-women employed in the building. He turned to enter his office, but, seized with some affection of the heart, sank upon the threshold, and in a few minutes life was extinct.

Mr. Martin became a member of the American Society of Civil Engineers June 1st, 1892.

CHARLES ROBERTS JOHNSON, M. Am. Soc. C. E.*

DIED SEPTEMBER 11TH, 1893.

To those who knew him only in business relations or by reputation alone, the name of Charles R. Johnson, whose death occurred at Saranac Lake, in the Adirondacks of New York, on September 11th, 1893, will be associated with his occupation, which was that of a signal engineer, in which he was one of the most eminent authorities in this country. Those who had the privilege of a more intimate acquaintance and friendship, knew him, not only to be a man of very marked ability as an engineer, but as a person whose character had a charm which attracted all who learned to know him, and were susceptible to the influence of a noble and generous nature.

He was a native of England, and was born in Higham Ferrers, in Northamptonshire, on January 17th, 1851. His father still survives him, and is William C. Johnson, who married Charlotte Sanders. The elder Johnson's first occupation was that of a builder, and later he was employed by the firm of Stevens & Sons, makers of railway signals in London.

Charles R. Johnson was educated at Dr. Pinches's academy in Kennington, London, and his first employment was in the drawing office of the City Architect in that city from 1867 to 1869. He remained there about two years, and then went into the employ of a Mr. Head, a builder, to make estimates and oversee work. When he was twenty-three years of age he made an engagement with the Messrs. Stevens &

* Committee to prepare memoir, Charles W. Buchholz, Walter Katté, M. N. Forney.
Compiled from *The American Engineer*.

Sons, manufacturers of signals in London, where his father was employed. His work there was to oversee the erection of signals. At the same time his uncle, Mr. Henry Johnson, was superintendent of the erection of work in the north of England, Scotland and Ireland, for the celebrated firm of Saxby & Farmer, of London, the leading firm of signal engineers in England and probably in the world. This relation of the uncle led to an engagement of the nephew by the same firm, and in 1875 he entered their employ. He was at first associated there with his uncle, and had charge of the erection of work on different English railways. This gave him great familiarity with the difficulties and complications which are constantly encountered in adapting signals to the requirements of different locations and conditions. The amount of traffic on some of the English lines was then very much greater than on any of our American roads. Consequently, systems of signals had to be developed and perfected there and adapted to the requirements of the traffic long before similar appliances were needed here. In putting up the signals made by Messrs. Saxby & Farmer, Mr. Johnson had the most abundant opportunity of becoming acquainted with all the multifarious details of their construction, the conditions they had to fulfill, the difficulties to be overcome, and the dangers to be guarded against. He therefore acquired a wonderful knowledge of the principles of railway signaling, and the intricacies growing out of a vast and complicated business which had to be controlled by the appliances which his firm were providing. He not only had charge of this work in England and Ireland, but in 1879 he was sent to France to superintend work which was done on some of the principal lines there. In 1880 he was sent to India as the representative of the interests of Saxby & Farmer in that country. While there he was much exposed to the influence of the climate, and contracted jungle fever, from the effects of which he never fully recovered. He remained in India only about a year, and then, owing to his illness, went to Australia, where he spent a few months, and in 1881 returned to England.

To understand "the state of the art" of signaling in this country at that time, it must be remembered that interlocking and block signaling were then almost unknown here. In 1873 Messrs. Toucey and Buchanan, of the New York Central and Hudson River Railroad, erected a system of interlocking signals and switches at Fifty-third Street, where the incoming and outgoing tracks of the Grand Central Depot in New York crossed each other. The plans of this apparatus were brought to this country by two brothers named Brierly, who had been in Saxby & Farmer's employ in London, and it was a modification of the mechanism used by that firm. Later a similar interlocking system was put in at the Spuyten Duyvil Junction of the same road. This mechanism afterwards was much improved by Messrs. Toucey and Buchanan. During the Centennial Exhibition in Philadelphia, in 1876,

the Pennsylvania Railroad Company erected some interlocking signals of the Toucey-Buchanan-Brierly system, to control the traffic at the terminals of their line, adjoining the exhibition grounds, and a little later a Saxby & Farmer apparatus was placed on that road at the junction east of Newark, N. J.

The first use of block signals controlled by telegraph in this country was on the Pennsylvania Railroad about 1873. In 1876 Messrs. Saxby & Farmer exhibited at the Centennial Exhibition a very complete model of their system of interlocking signals, and also some of the apparatus employed in it and in block signals. It may be said that the acquaintance of many railroad men in this country with the systems of signals used in England dates from this exhibit. The need of better methods of controlling the movement of trains on our railroads had been experienced on many of our roads, and a number of railroad officers had attempted to evolve, out of their inner consciousness, some system adapted to their needs, or they sought the aid of some inventive genius to help them out of their difficulties.

In 1881 the Pennsylvania Railroad Company had experienced so much trouble with the grade crossings of their line with other railroads, and with other signal problems on their road that they applied to Messrs. Saxby & Farmer and asked whether they could send a competent person to this country to advise them in regard to signaling. That firm recommended Mr. Charles R. Johnson, and it was under that engagement that he first came to this country. It may be said that he was the first engineer who was thoroughly and practically familiar with the systems in use in Europe, who was placed in charge of the construction of signaling systems here. On his arrival he made an investigation and report on the problem of the Elizabeth grade crossing and some other analogous subjects, and was then engaged by the Union Switch and Signal Company, of Pittsburgh, which had been organized some years earlier, and had engaged in the manufacture of signals. During the first part of his engagement with this company he acted as a contracting agent for it, with his office in New York. Later he was made General Manager and removed to Pittsburgh.

In 1888 Mr. Johnson left the employ of the Union Switch and Signal Company, and he then organized the Johnson Railroad Signal Company, whose works were established at Rahway, N. J., and of which he was the President and General Manager. The formation of this company was the realization of a dream which he in common with all ambitious men feel—that of being at the head of an enterprise of which they have the control. He worked at it with the energy which came from the hope of success and confidence in his capacity for achieving it. His expectations were not entirely unfulfilled. The enterprise was fairly launched and afloat and started on a prosperous voyage, when indications of failing health manifested themselves, at first at infrequent

periods, which allowed him to give his time and labor to his much-cherished scheme; but just as success was assured, the warnings could no longer be disregarded, and in May, 1892, he gave up active business and went to the Adirondacks with the hope that rest and out-door life would lead to recovery. Alternately hoping and fearing, he improved at times, but never quite recovered what he had before lost, and on September 11th, 1893, the end came, and the life which had been so useful was ended. His last resting place on earth is in Mount Hope Cemetery, in Rochester, N. Y.

Those only who had the privilege of intimate friendship with Charles Roberts Johnson can know how difficult it is to do justice to his character. Of his professional knowledge and ability little more need be said. The striking trait was the clearness and soundness of his judgment and opinions, and, it may safely be said, that in matters pertaining to his specialty of signal engineering there has never been any one in this country with as thorough a knowledge of that field, and whose opinions and advice could be so implicitly accepted.

Mr. Johnson became a Member of the American Society of Civil Engineers, June 3d, 1885.

LUCIUS A. SMITH, M. Am. Soc. C. E.

DIED JANUARY 5TH, 1894.

Lucius A. Smith, long known through his many years' service with the Continental Iron Works, was born in Prospect, Conn., July 11th, 1831. He received a common-school education in New Haven, and entered the medical department of Yale College, from which he graduated in 1852, receiving the degree of Doctor of Medicine. Soon after graduation he was appointed assistant physician at the State Asylum for the Insane, at Hartford, Conn., but, after serving in that position for a year, he resigned and returned to New Haven for the practice of his profession. Ill health, however, obliged him to relinquish it after a few months' work.

Marine architecture had always been a favorite study with Dr. Smith, and in 1863 he relinquished all thoughts of following his profession, and devoted himself entirely to engineering and naval architecture. He became associated with the Continental Iron Works, so well known by the construction of the *Monitor*, and was made superintendent. His connection with this company was retained until the time of his death. During the Civil War, Dr. Smith superintended

the construction of several vessels for the United States Navy, and afterwards turned his particular attention to designing merchant vessels and yachts.

The yachts *Phantom*, *Day Dream* and *Runaway*, were designed and built by him. He also designed a number of the ferry-boats now used by the Union Ferry Company.

At the time of his death he was superintending the construction of a large gun lift or disappearing carriage for a 12-in. gun at Sandy Hook.

Dr. Smith was a man of marked intellectual power, and his opinion on engineering subjects was often required and always invaluable. In his character as a man he was universally loved and respected.

He became a member of the American Society of Civil Engineers May 7th, 1873.

JOSEPH D. POTTS, M. Am. Soc. C. E.*

DIED DECEMBER 3D, 1893.

Joseph D. Potts was born at Springton Forge, Chester County, Pa., December 4th, 1829, and was the son of David Potts and Rebecca Speakman Potts. He was a descendant in the sixth generation of Thomas Potts who was the pioneer iron master of the Schuylkill region. His great-great grandfather, John Potts, was the founder of Pottstown, Montgomery County, Pa., and his grandfather, Joseph Potts, was the owner of Glasgow Forge and Valley Forge, near the former of which ancient iron establishments his father, David Potts, was born.

The subject of this memoir did not follow the occupation of his ancestors, but turned his attention to civil engineering, in the practice of which profession he was actively engaged for several years, commencing in the year 1852, on the Sunbury and Erie Railroad. Subsequently he became Vice-President of the Steubenville and Indiana Railroad Company, and in February, 1858, was appointed Superintendent of the Western or Pittsburgh Division of the Pennsylvania Railroad, which position he held until November, 1859.

Upon the breaking out of the Civil War, Governor Curtin placed Mr. Potts upon his staff as Lieutenant-Colonel and Chief of the Transportation and Telegraph Department of the State of Pennsylvania, the duties of which office he performed until December, 1861, when he was relieved by their transfer to the Federal authorities.

* Memoir written by W. Hasell Wilson, Hon. M. Am. Soc. C. E.

In February, 1862, he was appointed by the Pennsylvania Railroad Company, Lessee, to the very responsible position of General Manager of the Philadelphia and Erie Railroad, from which he resigned in September, 1865. From 1865 to 1877, he was President of the Empire Transportation Company, and on February 20th, 1869, was elected President of the Erie and Western Transportation Company.

The following has been kindly contributed by Mr. Frank J. Firth, President of the Erie and Western Transportation Company:

"Colonel Joseph D. Potts was one of the most prominent men engaged in the through-freight-carrying business of this country. During his presidency of the Empire Transportation Company, which commenced its business operations on June 25th, 1865, with a shipment of five carloads of refined petroleum in barrels, from the oil regions of Pennsylvania and New York, that company became the most extended, powerful and efficient corporation engaged in the through-freight-carrying business. Its cars passed between the Atlantic and Pacific without breaking bulk, and its traffic agreements covered in that early day over 25 000 miles of railroad.

"Through its auxiliary companies, it owned and operated over 500 miles of pipe line, gathering for shipment in its bulk-tank cars, of which it was the originator, its oil refineries had a daily capacity of over 6 000 bbls. of oil; it operated through the Erie and Western Transportation Company a fleet of freight and passenger steamers on the Great Lakes, together with the docks, warehouses and grain elevators needed for their cargoes at the lake ports. A fleet of steam canal boats and barges carried cross freight on the Erie Canal to and from the lake steamers at Buffalo.

"All of this widely extended business, embracing almost every modern method of transportation, was created and developed under the leadership of Colonel Potts. He held the Presidency of the Empire Transportation Company from its inception in 1865, until its final dissolution in 1877, and continued in the Presidency of the Erie and Western Transportation Company until June 7th, 1881, when he resigned to secure needed relief from business cares."

Upon his retirement from the presidency of the Erie and Western Transportation Company, the special committee to whom his letter of resignation was referred reported as follows: "Mr. Potts' proposed retirement will sever relations which have existed between him and this Company since the beginning of its operations. Under his fostering care the Company has so grown that it is to-day prosperous, substantial, strong and healthy, financially and otherwise. So highly appreciated are his services that the Committee feel that they are speaking, not only for the Board of Directors, but for the whole body of stockholders, in saying that to him is due in the largest measure this excellent condition of affairs; that without his foresight, his un-failing power of resource, and his untiring energy, no such result could have been obtained."

From 1874 to the time of his death, Mr. Potts was a director of the National Storage Company and the National Docks Railroad Company, corporations in the State of New Jersey, being for a portion of the time a managing director of the former, and president of the latter

company. He was also president of the Enterprise Transit Company, of Pennsylvania.

He was president for several years prior to 1885, and since then a director, of the Girard Point Storage Company, which is owner of the extensive wharves, elevators, warehouses, railroads, tanks, etc., near the mouth of the Schuylkill River, in the city of Philadelphia.

He was also, from its establishment, a large owner and director in the International Navigation Company, which operates the Red Star and American lines of ocean steamers; and a director in the Inman and International line, between New York and Liverpool.

Although Mr. Potts had of late years withdrawn to a great extent from active and care-involving positions, he yet retained, as will be seen from the foregoing enumeration, sufficient connection with business operations to fully occupy his time and attention. In addition to what has already been stated, he became interested, in the year 1879, in the Potts Brothers' Iron Works, of Pottstown, and the Chester Pipe and Tube Works, at Chester. In 1880, he purchased the Isabella Furnace property in Chester County, Pa., formerly owned by his father. In 1886, he was elected a trustee of the University of Pennsylvania. He was appointed in 1887 one of the Board of Inspectors of the prisons of Philadelphia, and in 1888 a trustee of the Western Saving Fund, of same city.

On June 8th, 1854, Mr. Potts married Mary, daughter of Dr. William McCleery, of Milton, Pa., at which place he died on December 3d, 1893, although his residence had been for many years at Philadelphia.

His wife and two sons survive him.

Mr. Potts became a Member of the American Society of Civil Engineers August 5th, 1868.

LIST OF MEMBERS.

ADDITIONS.

MEMBERS.		Date of Membership.	
BANNISTER, CHARLES KIMBALL ..	Ogden, Utah.....	May	3, 1893
DeROCHEMONT, BARON QUINETTE, 18	Rue de Marignan, Paris, France	Jan.	3, 1894
MYERS, WILLIAM BESWICK	14 Victoria St., Westminster, S. W., London, England..	Jan.	3, 1894

ASSOCIATE MEMBERS.

CACCIA, JULIAN EDWARD.....	24 Via Gino Capponi, Florence, Italy.....	Jan.	3, 1894
EHLE, BOYD	Fort Plain, N. Y.....	Jan.	3, 1894

HENRY, PHILIP WALTER	315 Madison Ave., New York City	Jan.	3, 1894
HOWARD, CHARLES POPE	1400 Grove Ave., Richmond, Va.	Jan.	3, 1894
TREADWELL, LEE	Keith and Perry Bldg., Kansas } J. Nov. 5, 1890 City, Mo. } Assoc. M. Oct. 4, 1893		
WILLIAMSON, SYDNEY BACON	U. S. Engineers' office, Wheeler Station, Ala.	Jan.	3, 1894

JUNIORS.

BORIGHT, WILLIAM PARSONS.....	177 East State St., Ithaca, N. Y.	Jan.	2, 1894
COVERDALE, WILLIAM HUGH.....	Care Pennsylvania Co., Pittsburgh, Pa.	Jan.	2, 1894
HARTWELL, HARRY	119 East 77th St., New York City	Jan.	2, 1894
MILES, DAVID ANDERSON	836 New York Life Bldg., Kansas City	May	2, 1893
ROSENTHAL, ALBERT.....	Goldsboro', N. C.	Jan.	2, 1894
SHAW, ENOS L.	City Engineer, Marinette, Wis.	Oct.	3, 1893
WEEKS, ALFRED, Jr.	P. O. Box 726, Wilkes-Barre, Pa.	Jan.	2, 1894
WHITE, ROBERT DAVIS.....	39 East 74th St., New York City	Jan.	2, 1894

CHANGES AND CORRECTIONS.

MEMBERS.

BOOKER, B. F.	Care Mexico Cuernavaca and Pacific Ry., 13 San Juan de Letran, Mexico, Mexico.
DEVIN, GEORGE.....	208 La Salle St., Chicago, Ill.
FISHER, FRANCIS D.....	404 Grand Ave., Brooklyn, N. Y.
FRANCIS, CHARLES	202 West 3d St., Davenport, Iowa.
HOLT, HENRY S.	297 Stanley St., Montreal, Canada.
KIELLAND, S. MUNCH.....	Chief Engineer Montana Southern Ry., Box 533, Helena, Mont.
KING, PAUL S.	General Manager Whitaker Cement Co., Lock Box 11, Easton, Pa.
MINOT, S. L.	76 Park Bldg., 2 Park Square, Boston, Mass.
NOYES, ALBERT F.	Ass't Chief Engineer State Board of Health, 13 Beacon St., Boston, Mass.
POST, JAMES C.	Major Corps of Engineers, U. S. A., Portland, Ore.

ROWE, R. D. 85 74th St., Chicago, Ill.
 ROWE, S. M. 85 74th St., Chicago, Ill.

ASSOCIATE MEMBERS.

FREEMAN, E. G. Trinidad Asphalt Co., 1 Broadway, New York.
 KIRKPATRICK, W. G. 36 Union Ave., Schenectady, N. Y.
 MAYER, AUG. Shreveport, La.
 ROSENBERG, F. 429 Clermont Ave., Brooklyn, N. Y.
 WOODS, H. D. City Engineer, West Newton, Mass.

JUNIORS.

BOECKLIN, WERNER Burlington, Ia.
 BRIGGS, WALDO C. South Norwalk, Conn.
 JEWETT, WILLIAM B. Hotel Belleview, Belleview, Fla.
 LAWLOR, FRANCIS D. H. 31 White St., St. John, N. B., Canada.
 MICHIE, W. R. P. O. Box 11, Wall, Pa.
 MYERS, JOHN H., JR. 4 Union Place, Troy, N. Y.
 NICHOLS, CHARLES H. 110 Colony St., Meriden, Conn.
 SIRRINE, J. E. 168 McBee Bldg., Greenville, S. C.

DEATHS.

ELY, GEORGE HERVEY. Elected Associate May 31st, 1892; died January 24th, 1894.
 LOTZ, WILLIAM HENRY Elected Member September 1st, 1875; died January 31st, 1894.
 LOW, GORHAM PARSONS. Elected Member April 21st, 1869; died January 8th, 1894.
 SMITH, LUCIUS A. Elected Member May 7th, 1873; died January 5th, 1894.

ADDITIONS TO

LIBRARY AND MUSEUM.

From John W. Bacon, Danbury, Conn.:
 Topographical Atlas of the State of Connecticut, by the U. S. Geological Survey.
 From Board of Harbor and Land Commissioners, Boston, Mass.:
 Annual Report for the year 1893.
 From John Bogart, New York:
 Annual Report of the State Engineer and Surveyor (N. Y.) for the fiscal year ending September 30th, 1891.

W. H. Brown, Philadelphia, Pa.:
 Record of Transportation Lines owned and operated by and associated in interest with the Pennsylvania Railroad, for year ending December 31st, 1893.
 College of Engineers and Architects, Palermo, Italy:
 Transactions, May-August, 1893.
 From Dr. Chas. G. Currier, New York:
 Gesundheits-Ingenieur, Vol. XVI, 1893.

- From Clemens Herschel, New York:
Ueber Wassermessung und insbesondere
über den Schinzelischen Hartgummi
Wassermesser.
- From Institution of Civil Engineers, London,
Eng.:
Underpinning and Tunneling under
Tenements.
Anglo-Chilian Nitrate Railway.
Railway Survey in India.
Formulas for Pile-Driving.
Filtration of Sewage.
Surface Tin Mining.
La Guaira Harbor Works.
List of Members, January 2d, 1894.
- From Iowa State Board of Health, Des Moines,
Iowa:
Monthly Bulletin, December, 1893.
- From J. Francis Le Baron, Jacksonville, Fla.:
Catalogue of Prehistoric Works East of
the Rocky Mountains.
- From Luigi Luiggi, Rome, Italy:
Recent Breakwaters and Sea Defences in
Italy.
- From National Academy of Sciences, through
Smithsonian Institution:
Memoirs of the National Academy of
Sciences, Vol. VI.
- National Museum, Rio, Brazil, through
Smithsonian Institution:
Archivos do Museu Nacional de Rio de
Janeiro, Vol. VIII.
- From Patent Office, London, Eng.:
Abridgments of Specifications for Pat-
ents, 11 parts.
- From Philosophical Society of Glasgow:
Proceedings, Vol. XXIV, 1892-93.
- From Amerigo Raddi, Spezia, Italy:
La Fulminazione Meteorica in Italia.
Un Nuovo Orologio Centesimale con In-
terno Rapporto Sessagesimale.
- From Baron Quinette de Rochemont, Paris,
France:
Les Ports de la Mersey et de la Clyde.
Les Ports Maritimes de la Hollande, Rot-
terdam et Amsterdam.
Les Ports Allemands de la Mer du Nord,
2 vols.
Les Ports Allemands de la Baltique, 2
vols.
Mémoire sur la Clyde, Glasgow, Port Glas-
gow et Greenock.
Bouée Sifflet Automobile du Système
Courtenay.
Notice sur l'Escaut Maritime et le Port
d'Anvers.
Note concernant le Type d'Écluse adopté
pour le Canal de l'Escaut à la Meuse.
Régime des Courants et des Marées à
l'embouchure de la Seine.
Canaux Maritimes de Nicaragua, du
Forth à la Clyde et de Corinthe.
Note sur l'Outillage Mécanique du Port
du Havre.
- Le Port du Havre. 3 vols.
Port du Havre. Notice sur les Modèles,
Cartes et Dessins, Exposition Maritime
du Havre.
De l'Amélioration du Port du Havre et
des Passes de la Basse Seine.
Les Ports Maritimes Le Havre. 2 vols.
Rôle et Importance de l'Outillage des
Ports.
Notice sur le Port d'Harfleur.
Portland Cement at Havre.
- From John A. Russell, San Francisco, Cal.:
San Francisco Municipal Reports for the
year ending June 30th, 1893.
- From Sanitary District of Chicago:
Proceedings of the Board of Trustees,
December 13th, 20th, 23d and 27th,
1893; January 3d, 10th and 13th, 1894.
- From U. S. Civil Service Commission:
Ninth Report, July 1st, 1891, to June
30th, 1892.
- From U. S. Naval Observatory:
Washington Observations, 1889.
- From U. S. Navy Department:
Pilot Chart of the North Pacific Ocean,
January, 1894.
- From U. S. Patent Office:
Alphabetical Lists of Patentees and
Inventions for the quarter ending June
30th, 1893.
- From U. S. Treasury Department:
Summary Statement of the Imports and
Exports of the United States for No-
vember, 1893.
- From U. S. War Department, Chief of Engi-
neers:
Civil Engineers Employed in the Im-
provement of Rivers and Harbors.
Commerce Passing Through St. Mary's
Falls Canal.
Dredging in the Indian River of Florida.
Dumping in New York Harbor.
Fourteen Specifications for the Improve-
ment of Certain Rivers and Harbors.
Improvement of Congaree River below
Columbia, S. C.
Raft Towing on the Great Lakes.
Report of Board of Engineers Regarding
Obstructions in the Columbia River.
Report of California Débris Commission.
Survey of Crawfish and Mill Creeks,
Ohio.
- From William Watson, Boston, Mass.:
Paris Universal Exposition, 1889. Civil
Engineering, Public Works and Archi-
tecture.
- From E. A. Ziffer, Vienna, Austria.
Mittheilungen des Vereines für die För-
derung des Local und Strassenbahn-
wesens, 7th and 8th Heft.
Internationaler Permanenter Strassen-
bahn Verein.

American Society of Civil Engineers.

PROCEEDINGS.

Vol. XX.—February, 1894.

MINUTES OF MEETINGS.

(Abstract of such as may be of general interest to Members.)

OF THE SOCIETY.

FEBRUARY 7TH, 1894.—The Society met at 20 o'clock, Past President Cohen in the chair; F. Collingwood, Secretary; and present, also, 62 members and 10 visitors.

Ballots were canvassed, and the following candidates were declared elected: As Members—Howard Adams Carson, Boston, Mass.; Marymilian Lewenson, New York City; James David Moffett (elected Assoc. M. Nov. 4th, 1891), Radford, Va. As Associate Members—Francis Wharton Dalrymple, Bradford, Pa.; James Benton French (elected Junior Feb. 6th, 1889), Richmond, Va.; John Van Buskirk Rapp, New York City; Bousak Christian Gotaas Schieldrop, Brooklyn, N. Y.

Announcement was made of the election by the Board of Direction on February 6th, 1894, of one Associate and six Juniors.

The following deaths were announced: George Hervey Ely, elected Associate May 31st, 1892; died January 24th, 1894. Gorham Parsons Low, elected Member April 21st, 1869; died January 8th, 1894. William Henry Lotz, elected Member September 1st, 1875; died January 31st, 1894. Lucius A. Smith, elected Member May 7th, 1873; died January 5th, 1894.

A paper by Desmond FitzGerald, M. Am. Soc. C. E., on "Lining a Water Works Tunnel with Concrete," was presented by the author, and was discussed by Messrs. R. W. Lesley, Brush, Brendlinger, Owen, W. B. Parsons, Kenneth Allen, Croes, Bogart, Nichols, Luiggi and FitzGerald.

FEBRUARY 21ST, 1894.—The Society met at 20 o'clock, Director L. L. Buck in the chair; F. Collingwood, Secretary; and present, also, 55 members and seven visitors.

The following deaths were announced: William Frederic Behrens, elected Junior November 6th, 1889; elected Associate Member, June, 7th, 1893; died February 6th, 1894. Abraham Gottlieb, elected Member September 4th, 1872; elected Director January 20th, 1892; died February 9th, 1894.

A paper by L. L. Tribus, Assoc. M. Am. Soc. C. E., on "Driven Wells of the Plainfield Water Works," was read by the author and was discussed by Messrs. Yates, Brush, Croes, R. W. Ware, Kenneth Allen, A. S. Tuttle and Tribus.

OF THE BOARD OF DIRECTION.

FEBRUARY 6TH, 1894.—Nine members present.

Director T. Guilford Smith was appointed a delegate from this Society to the Eleventh International Congress of Medicine, to be held at Rome in 1894.

The following resolutions were unanimously adopted.

Whereas, the Board of Direction of the American Society of Civil Engineers desires to give expression to the appreciation of the Society for the kindness with which its Members were received at Sandy Hook on January 18th, 1894; be it therefore

Resolved, that the thanks of the American Society of Civil Engineers are hereby heartily tendered to Brigadier-General D. W. Flagler, Chief of Ordnance, United States Army, for the kind permission to visit Sandy Hook, granted by him to the Society.

Whereas, the Board of Direction of the American Society of Civil Engineers desires to give expression to the appreciation of the Society for the kindness with which its Members were received at Sandy Hook on January 18th, 1894; be it therefore

Resolved, that the thanks of the American Society of Civil Engineers are hereby heartily tendered to Major Clifton Comly, U. S. A., for his kindness and courtesy to the Society as a body, and its Members individually, on that occasion.

Whereas, the Board of Direction of the American Society of Civil Engineers desires to give expression to the appreciation of the Society for the kindness with which its Members were received at Sandy Hook on January 18th, 1894; be it therefore

Resolved, that the thanks of the American Society of Civil Engineers are hereby heartily tendered to Captain Frank Heath, commanding, and to the officers of the Proving Ground at Sandy Hook, who assisted him, for the courteous and cordial reception extended to this Society as a body, and to its Members individually, and also for the experimental firings which proved so exceedingly interesting and instructive.

Whereas, the Board of Direction of the American Society of Civil Engineers desires to give expression to the appreciation of the Society for the kindness with which its Members were received at Sandy Hook on January 18th, 1894; be it therefore

Resolved, that the thanks of the American Society of Civil Engineers are hereby heartily tendered to Lieutenant-Colonel G. L. Gil-

lespie, Corps of Engineers, U. S. A., for his courteous invitation to, and reception of, the Society as a body, and its members individually, on the occasion of the recent visit to the very interesting works under his charge at Sandy Hook.

On motion it was resolved that the above resolutions be properly engrossed and forwarded to the gentlemen named therein.

A committee of the Board was appointed to consider and report suggestions as to the time and place for holding the next Annual Convention.

The Committee on Publications was requested to formulate a set of rules for the proper government of drawings and illustrations for papers presented for publication, with a view of securing the most economical publication of illustrations, consistent with good work.

Applications were considered and routine business transacted. The following were elected: As Associate—Herbert Steward, New York City. As Juniors—Carolus Morton Broomall, Media, Pa.; Peter Platter Evans, Chillicothe, O.; Alger Crocheron Gildersleeve, New York City; Edward Francis Haas, New York City; Julius Bernstein Hurtig, Cincinnati, O.; Kenneth Oake Plummer Reinholdt, Elizabeth, N. J.

MEMOIRS OF DECEASED MEMBERS.

DAVID LOWBER SMITH, M. Am. Soc. C. E.*

DIED OCTOBER 10TH, 1893.

David Lowber Smith was born in New York City, February 22d, 1846. Educated in the public schools and in the College of the City of New York, he was graduated in 1866, with honors, receiving the degree of B. S.

Easily first in his class in mastery and comprehensiveness of details, and in accuracy and reality of his acquirements, he early displayed those qualities of preciseness, thoroughness, promptness and energy, which, carried into his manhood, proved to be the dominant traits in his character, and so admirably equipped him for the exacting profession of civil and mining engineer.

Immediately after graduation, he went to France, and, after familiarizing himself with the French language, he entered the famous *École des Mines*, in Paris. He received its diploma in 1869, and returned to this country, possessed of a full knowledge of French engineering methods.

* Memoir prepared by John E. McKay, M. Am. Soc. C. E.

In 1870 he was made Assistant Engineer in the City Works Department of Brooklyn, and was assigned a position on the construction of the reservoir at Hempstead, where he remained till the work was completed in 1878.

At that time New York City was defendant in a suit brought by the Tilly Foster Iron Mining Company, of Putnam County, N. Y., to recover damages to its property, claimed to have been caused by the neglect and carelessness of the employees of the city during the construction of the aqueduct adjoining the mine. Mr. Smith was commissioned by the city as an expert to gather evidence and estimate the amount of damages, if any. After spending nearly a year and a half at the mine, and investigating the charges with his habitual carefulness and exhaustiveness, the mining company was non-suited, entirely on Mr. Smith's testimony, confirmed in every particular after personal inspection by General John Newton.

On June 11th, 1878, Mr. Smith was appointed Assistant Engineer in the Department of Public Works of New York City, and in November, 1883, Water Purveyor. He became Deputy Commissioner of Public Works in November, 1888, and in January, 1889, Mayor Hewitt made him Commissioner of Public Works, to fill out the unexpired term of General Newton, ending May 1st, 1889. In the fall of 1889 he was placed in charge of the Bureau of Arrears and Assessments in the Tax Department, and in 1891 was promoted to the office of Assistant Deputy Comptroller, which post he held at the time of his death.

A loyal and public-spirited citizen, Mr. Smith discharged the duties of these many conspicuous and responsible trusts with marked ability, conscientious fidelity, and strictest honesty.

Genial and social in temperament, bright and witty in thought, quick in speech, he was a delightful companion. Naturally obliging and unreserved, he was a true friend. Hopeful, buoyant and aspiring, his future was radiant with large promise of still higher and more worthy achievements.

In 1872 Mr. Smith married Miss Sophia Kirkpatrick, of the old and prominent New Jersey family of that name. She and an interesting family of 10 children survive him.

Mr. Smith became a Member of the American Society of Civil Engineers, May 4th, 1887.

WILLIAM SCHERZER, M. Am. Soc. C. E.*

DIED JULY 20TH, 1893.

William Scherzer was born in Peru, La Salle County, Ill., on January 27th, 1858. He received his primary education in the public schools of Peru, and later entered the private school of Professor

* Memoir prepared by C. L. Strobel, M. Am. Soc. C. E., and Mr. August Ziesing.

Eggers. In 1875, at the age of seventeen, he went to Zurich, Switzerland, and entered the Polytechnic School in that city, to take the regular course in civil engineering. He graduated from that school in 1880. Returning to America, he filled the position of engineer to the Matthiessen & Hegeler Zinc Company, at La Salle, Ill., for the ensuing three years, designing furnaces and the buildings and machinery used in connection with smelting works and coal mines.

In 1883 he entered the employ of the Pittsburgh, Fort Wayne and Chicago Railway Company, and thenceforth devoted himself to bridge engineering as a specialty.

In 1885 he accepted the position of principal assistant to the chief engineer of the Keystone Bridge Company, with office in Chicago, and continued in the employ of that company for eight years, until the 1st of January, 1893. He then entered into business for himself at Chicago as a consulting and contracting engineer.

He died on Thursday morning, July 20th, 1893, at the early age of thirty-five years. His last engineering work, and a very important and interesting one, was the design for a rolling bascule lift bridge to span the Chicago River between Jackson and Van Buren Streets, for the Metropolitan West Side Elevated Railroad Company, and the design for a similar bridge for the city of Chicago at Van Buren Street. These bridges are now under contract to be built. These designs are a departure from the plans and methods heretofore adopted for lift bridges, and, it is believed, are an improvement on these.

He was unfortunately deprived of the satisfaction of seeing the construction and successful completion of these structures, for unre-mitted application to his work, and, perhaps, some lingering effects of an attack of typhoid fever one year previous, brought upon him his fatal illness. He died of an attack of brain fever, after a short illness.

William Scherzer was from childhood of a most ambitious nature, and no obstacle ever seemed too great to overcome when he had once started out to accomplish a certain purpose. He was at the same time cautious, and carefully weighed the chances of failure or success in an undertaking before going into it. At the Polytechnic School in Zurich he was consequently in the front rank in his class, both in play and work, and was always considered a formidable competitor by all intimately acquainted with him.

William Scherzer was unmarried. He was of a kind and gentle disposition, quiet and modest in demeanor, and will live in the fond remembrance of all who knew him. His mind was of a high order, and he was just beginning to reap a liberal return for his knowledge, ability and experience when death put an end to his career.

He became a Member of the American Society of Civil Engineers September 5th, 1885.

QUINCY ADAMS GILLMORE, M. Am. Soc. C. E.*

DIED APRIL 7TH, 1888.

Quincy Adams Gillmore was born at Black River, Loraine County, O., February, 1825; graduated at West Point at the head of his class in 1849, and entered the army as Brevet Second Lieutenant of Engineers; served three years as assistant in the construction of the defenses at Hampton Roads, Va., returning to West Point in 1852, as instructor in military engineering. In July, 1856, he was promoted to be First Lieutenant and placed in charge of the Engineers' Agency at New York. He was promoted to a captaincy August, 1861, and made Chief Engineer in the Port Royal expedition under Brig.-General T. W. Sherman. After a careful reconnoissance of Fort Pulaski, Ga., Captain Gillmore reported that he deemed the reduction of that work practicable by batteries of bombs and rifled guns established on Tybee Island, one mile distant from the Fort; and he was at once placed in command of the troops engaged in the siege. After nearly two months of incessant labor, Fort Pulaski was completely invested and the Savannah River blockaded; and on the evening of April 9th, General Gillmore (then Acting Brigadier-General) issued his orders for bombardment. On the 10th, the commander of Fort Pulaski having refused to surrender, the bombardment was commenced at 8.15 A. M., continuing with little cessation until 2 P. M. of the 11th, when the white flag was raised from the Fort, the surrender being consummated that afternoon and evening.†

In August, 1862, General Gillmore was assigned to the command of the division of troops in Kentucky. He defeated General Pegram at the battle of Somerset, for which service he was breveted Colonel. In June, 1863, he was called to command the Department of the South, and in July following, the 10th Army Corps. It was while holding this command that he conducted the operations against Charleston, comprising the descent on Morris Island, the reduction and capture of Fort Wagner, and the bombardment and practical demolition of Fort Sumter from batteries two miles distant. The General-in-Chief (Halleck), in speaking of this siege, said: "General Gillmore's operations have been characterized by great professional skill and boldness. He has overcome difficulties almost unknown in modern war sieges; indeed, his operations at Morris Island constituted a new era in the science of engineering and gunnery."

Transferred to the James River in 1864, in command of the 10th Army Corps, he was engaged (May 13th) in the assault in front of

* Abstracted from "Johnson's Universal Cyclopedia."

† A full account of the capture of Fort Pulaski will be found at page 515 of "Johnson's Universal Cyclopedia."

Drury's Bluff, and (May 16th) at the battle of Drury's Bluff. Summoned to Washington in July, on the approach of General Early, he commanded two divisions of the 19th Army Corps in the defense of that city, and in the subsequent pursuit of Early's command, during which he received severe injuries by falling from a horse. From February to November, 1865, he commanded the Department of the South, resigning his voluntary commission December, 1865. After the war he was assigned to duty in charge of fortifications on the Atlantic Coast, from New York to Florida, being also associated with the improvement of rivers and harbors on the coasts of South Carolina, Georgia and Florida,

In June, 1863, he was promoted to be Major; January, 1874, to be Lieutenant-Colonel, and February, 1883, to be Colonel, of the Corps of Engineers. In July, 1879, he was appointed President of the Mississippi River Commission. For gallant conduct at Morris Island, Fort Wagner and Sumter, he was breveted Brig.-General and Major-General of the United States Army. Among his published works are: "Siege and Reduction of Fort Pulaski," "A Practical Treatise on Limes, Hydraulic Cements and Mortars," "Engineer and Artillery Operations Against the Defenses of Charleston in 1863," "Report on Béton Aggloméré or Coignet-Béton," "Practical Treatise on Roads, Streets and Pavements," and "Tests of Building Stones in the United States."

General Gillmore was elected a Member of the American Society of Civil Engineers December 2d, 1868.

He served as a member of the Board of Direction in 1875.

LIST OF MEMBERS.

ADDITIONS.

MEMBERS.		Date of Membership.	
CARSON, HOWARD ADAMS.....	110 Boylston st., Boston, Mass.	Feb.	7, 1894
LEWINSON, MAXYMILIAN.....	90 Nassau st., New York City.....	Feb.	7, 1894
TAYLOR, JAMES TOWNSEND	Riverside, Cal.....	Jan.	3, 1894

ASSOCIATE MEMBERS.

FRENCH, JAMES BENTON	Pencoyd, Pa. {	J.	Feb.	6, 1889
		Assoc. M.	Feb.	7, 1894
PHILLIPS, HIRAM	810 Olive st., St. Louis, Mo.	Jan.	3, 1894	

ASSOCIATE.

STEWART, HERBERT	Seventh ave. and 154th st., New York City .	Feb.	6, 1894
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JUNIORS.		Date of Membership.
BROOMALL, CAROLUS MORTON.....	Media, Pa.....	Feb. 6, 1894
GILDERSLEEVE, ALGER CROCHERON.....	28 West 48th st., New York City.....	Feb. 6, 1894
HAAS, EDWARD FRANCIS	65 West 49th st., New York City.....	Feb. 6, 1894
REINHOLDT, KENNETH OAKE PLUMMER	315 West Front st., Plainfield, N. J.	Feb. 6, 1894

CHANGES AND CORRECTIONS.

MEMBERS.

ALLEN, JAMES P.	8 Ladson st., Charleston, S. C.
BENT, C. C. F.	Office of General Agent B. & O. R. R., Philadelphia, Pa.
BREITHAUP, W. H.	73 Broadway, New York City.
BURROWES, F. S.	720 Hickox Bldg., Cleveland, Ohio.
CISNEROS, FRANCIS J.	2 The Grove, Boltons, London, S. W. England.
CLEMENT, F. H.	10 West 29th st., New York City.
DELAFIELD, CLARENCE	1 Broadway, New York.
GRANT, E. W.	North Chillicothe, Ill.
HOWE, W. B. W., Jr.	Bartow, Florida.
LEFFINGWELL, W. H.	Colorado Springs, Colo.
MCCLINTOCK, W. E.	15 Court square, Boston, Mass.
MILLS, C. M.	Phoenixville, Pa.
POYNOR, D. A.	297 Commerce st., Dallas, Tex.
RAYMOND, CHARLES WARD	1611 Larkin st., San Francisco, Cal.
STEWART, JOHN M.	Assistant Engineer Dept. of Docks, foot West 57th st., New York City.
WEBB, GEORGE H.	26 Eliot Block, Williamsport, Pa.

ASSOCIATE MEMBERS.

HENNING, D. W.	127 East 23d st., New York City.
KYLE, GEORGE A.	Engineer Dept. E. & O. S. W. R. R., Cincinnati, Ohio.
THOMSON, T. KENNARD	193 Franklin st., Buffalo, N. Y.
WILLIAMSON, S. B.	U. S. Engineers' Office, Florence, Ala.

ASSOCIATES.

LESLEY, R. W.	22 South 15th st., Philadelphia, Pa.
RICHARDSON, CLIFFORD	Central Power Station W. & G. R. R., Washington, D. C.
WATKINS, J. E.	Director Dept. Industrial Arts, Colum- bian Museum, Chicago, Ill.

JUNIORS.

BAUM, GEORGE	Assistant Engineer United Electric Light and Power Co., Vanderbilt Bldg., New York City.
IRWIN, J. C.	Room 18, New York Central Station Albany, N. Y.
LUDWIG, J. ALFRED.....	812 18th st., N. W., Washington, D. C.
MEYER, HENRY C., Jr.....	72 Mountain ave., Montclair, N. J.
MOORE, C. E.....	37 Jefferson ave., Brooklyn, N. Y.
PANI, C. E.	Resident Engineer Tampico Harbor Works, Tampico, Mexico.
YEREAANCE, W. B.....	Box 46, South Orange, N. J.

RESIGNATIONS.

MEMBERS.

Date of
Resignation.

BUDDE, OTTO.....	February 21, 1894
FIESER, L. F.....	February 10, 1894

JUNIOR.

USINA, D. A.....	January 1, 1894
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DEATHS.

BEHRENS, WILLIAM FREDERIC.....	Elected Junior, November 6, 1889; As- sociate Member June 7, 1893; died February 6, 1894.
GOTTLIEB, ABRAHAM	Elected Member September 4, 1872; died February 9, 1894.

ADDITIONS TO LIBRARY AND MUSEUM.

From Albany (N. Y.) Water Commissioners:
Forty-third Annual Report, for 1893.
From American Institute of Mining Engi-
neers, N. Y.:
The Physics of Steel.
The Origin of the Gold-Bearing Quartz of
the Bendigo Reefs, Australia.
The Stetefeld Furnace
Solids Falling in a Medium.
The Open-Hearth Process.
The Limitations of the Gold Stamp-Mill.
Summary of American Improvements
and Inventions in Ore Crushing and
Concentration.
Mine Explosions Generated by Grahamite
Dust.

Blowing Engines.
General and Special Observations con-
cerning Ore Dressing.
Review of American Blast-Furnace Prac-
tice.
Geological Distribution of the Useful
Metals in the United States.
Ore-Washer at Longdale, Virginia.
The Consumption of Fuel in the Taylor
Gas Producer Plants at the Aspen and
Marsac Mills compared.
The Bertha Zinc Mills.
The Separation of Blende from Pyrites.
Note on Experiments on the Specific
Gravity of Gold contained in Gold-
Silver Alloys.

- The Determination of Phosphorus in Coal and Coke.
 Note on Certain Magnetic Phenomena in Gold-Bearing States.
 Improved Slag Pots.
 Notes on the Underwatering of a Flooded Mine.
 Notes on the Reworking of Anthracite Culm Banks.
 Survey of Underground Connection at Leavenworth, Kansas.
 The Franklinite Deposits of Mine Hill, Sussex County, New Jersey.
 The Cerro de Pasco Mining Industry.
 The Bessemer Process as Conducted in Sweden.
 Product and Economical Results of the Marsac Refinery for the year 1892.
 The Genesis of Ore Deposits.
 The Growth of American Mining Schools.
 Some Experiments for Determining the Refractoriness of Fire Clays.
 Recent Advances in Pyrometry.
- From L. G. Carpenter, Fort Collins, Colo.:
 The Fifth Annual Report of the Agricultural Experiment Station of the State Agricultural College, Fort Collins, Colorado, for the year 1892.
- From Howard A. Carson, Boston, Mass.:
 Fifth Annual Report of the Board of Metropolitan Sewerage Commissioners, January, 1894.
- From Alfred C. Chapin, New York:
 Tenth Annual Report of the Board of Railroad Commissioners of the State of New York, for the fiscal year ending June 30th, 1892.
- From Cornell University, Ithaca, N. Y.:
 Register for 1893-94.
- From Engineering Association of New South Wales, Sydney, N. S. W.:
 Annual Report of the Railway Commissioners for the year ending June 30th, 1893.
 Annual Report of the Department of Mines and Agriculture, New South Wales, for the year 1892.
- From Frankfurt Architects' and Engineers' Society:
 Frankfurt am Main und Seine Bauten.
- From E. Gilpin, Halifax, N. S.:
 Report of the Department of Mines, Nova Scotia, for the nine months ending September 30th, 1893.
 The Use of Safe Explosives in Mines.
- From Harvard College, Cambridge, Mass.:
 Annual Reports of the President and Treasurer, 1892-93.
- From A. Huet, Hague, Holland:
 Voordracht open Verbinding van Amsterdam met de Noordzee.
- From Walter Katté, N. Y.:
 Improvements in Permanent Way and the Needs and Possibilities of Better Rail Fastenings.
- From E. Kulchling, Rochester, N. Y.:
 Seventeenth Annual Report of the Executive Board, Rochester, N. Y., 1893.
- From Minister of Public Works, Rome, Italy:
 Giornale del Genio Civile, January to October, 1893.
- From Patent Office, London, England:
 Abridgments of Specifications for Patents. Six parts.
- From Railroad Commissioners, State of Maine:
 Thirty-fifth Annual Report for 1893:
- From A. Riedler, Berlin, Germany:
 Amerikanische technische Lehranstalten.
- From Smithsonian Institution, Washington, D. C.:
 Annual Report of the Board of Regents of the Smithsonian Institution to July, 1891.
- From Technical High School, Berlin, Germany:
 Rede zum Geburtsfeste Seiner Majestät des Kaisers und Königs Wilhelm II, January 26th, 1894.
- From U. S. Coast and Geodetic Survey:
 Bulletin No. 28. The Constant of Aberration.
 Bulletin No. 29. The Methods and Results of the U. S. Coast and Geodetic Survey.
 Bulletin No. 30. Units of Electrical Measure.
- From U. S. Department of Agriculture, Weather Bureau:
 Report of the Chief of the Weather Bureau, 1891-92.
- From U. S. Department of Education:
 Report of the Committee on Secondary School Studies.
 The History of Education in Delaware.
 The Spelling Reform.
- From U. S. National Museum:
 Bulletins Nos. 44, 45, 46.
 Proceedings. Vol. xv, 1892.
- From U. S. Treasury Department:
 The Foreign Commerce and Navigation of the United States for the year ending June 30th, 1893.
 Immigration and Passenger Movement at Ports of the United States during the year ending June 30th, 1893.
 Annual Report of the Light House Board for the fiscal year ending June 30th, 1893.
- From U. S. War Department, Adjutant-General's Office:
 Official Army Register for January, 1894.
- From U. S. War Department, Chief of Engineers:
 Report upon the Construction of the Building for the Library of Congress during the year ending December 1st, 1893.
 Thirteen Specifications for the Improvement of Rivers and Harbors:
- From University of the State of New York, Albany, N. Y.:
 State Library Bulletin No. 4, January, 1894. (Index of State Legislation in 1893.)
- From W. Cawthorne Unwin, London, England:
 The Development and Transmission of Power from Central Stations.
- From Van Nostrand Company, N. Y.:
 Sewage Disposal in the United States.
- From Welton & Bonnett, Waterbury, Conn.:
 Twenty-seventh Report of the Board of Water Commissioners of the City of Waterbury, Conn., for the year ending December 31st, 1893.

BOOK NOTICE.

**PROCEEDINGS OF THE SOCIETY FOR THE PROMOTION OF
ENGINEERING EDUCATION, Vol. I.**

Proceedings of Section E of the World's Engineering Congress, 6½ x 9
ins., pp. 342. Columbia, Mo.: E. W. Stevens, Printer, 1894.

This book contains the complete papers read before Section E of the World's Engineering Congress, held at Chicago in August of 1893, as well as the minutes of the proceedings of that Congress at its opening session, and those of Section E throughout its session of five days. As was quite natural, these papers were written, read and discussed, almost without exception, by various professors in the engineering schools in this country, although the Congress was fortunate enough to have with them some of the prominent foreign educators in engineering.

There is much in these papers which should command the earnest attention of practicing engineers who are interested in engineering education. They are practically the first papers of this kind which have expressed the views controlling the education of engineers in the United States, although some very important papers and discussions on engineering education by members of the American Society of Civil Engineers and others appeared in the *Transactions*, Vols. II and III, and in a special pamphlet issued by the Society; for that reason alone they possess unusual value. The success of Section E of the Congress was so great that at the close of its session provision for the extension of its work was made in the formation of the Society for the "Promotion of Engineering Education," the proceedings of which this book forms the first volume.

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American Society of Civil Engineers.

PROCEEDINGS.

Vol. XX.—March, 1894.

MINUTES OF MEETINGS.

(Abstract of such as may be of general interest to Members.)

OF THE SOCIETY.

MARCH 7TH, 1894.—The Society met at 20 o'clock, Colonel William P. Craighill, President, in the chair; F. Collingwood, Secretary, and present, also, 77 Members and 12 visitors. Ballots were canvassed and the following candidates were declared elected: As Members: John Adams Cole, Chicago, Ills.; Everett Garrison, Newburgh, N. Y.; John Dove Isaacs, San Francisco, Cal.; Theodore Paschke, New York City; George Montague Wheeler, Washington, D. C. As Associate Members: George Thomas Barnsley, Olney, Md. (elected Junior May 31st, 1892); Maurice Wurtz Cooley, Bucyrus, O.; Frederick Collamore Hitchcock, Washington, D. C.; Isaac Matthewson, Chihuahua, Mexico; Charles William McMeekin, Des Moines, Ia. (elected Junior April 2d, 1890); Horace Hulbrud Mitchell, New-ark, N. J.; Hiram Newton Savage, National City, Cal.

Announcement was made of the election, by the Board of Direction, of two Associates and six Juniors.

A paper by Robert Cartwright, M. Am. Soc. C. E., on "The Electric Station of the Citizens' Light and Power Company at Rochester, N. Y.," was presented by the author, and was discussed by Messrs. Craighill, Brinckerhoff, B. R. Green, George Hill, Emery, and the author.

MARCH 21st, 1894.—The Society met at 20 o'clock, Vice-President Macdonald in the chair; F. Collingwood, Secretary, and present, also, 62 Members and 13 visitors.

The death of Allan Campbell, elected Member February 19th, 1868; Honorary Member March 1st, 1892; died March 18th, 1894, was announced.

A paper by Morton L. Byers, Jun. Am. Soc. C. E., on "The Renewal of the Channel Pier of the Cincinnati and Muskingum Valley Railway Bridge, over the Scioto River," was read by the Secretary.

A paper by A. C. Cunningham, Assoc. M. Am. Soc. C. E., entitled, "An Instructive Eye-Bar Test," was presented. Written discussions on the subject were read from Percival Roberts, Jr., R. S. Thurston, James Christie and Charles Macdonald, and oral discussions followed by Messrs. Macdonald, Knap, Washington, Whinery, Blakely and L. L. Buck.

OF THE BOARD OF DIRECTION.

MARCH 6TH, 1894.—The Board met at 20 o'clock, 12 Members present.

The death of Director Abraham Gottlieb, M. Am. Soc. C. E., elected Member September 4th, 1872, was announced to the Board by the President.

The time and place for the next Annual Convention was considered. Two Associates and six Juniors were elected.

Routine business was transacted and applications for membership considered.

A Code of Rules for the award of The Collingwood Prize for Juniors was adopted.

MEMOIRS OF DECEASED MEMBERS.

PATRICK JOHN FLYNN, M. Am. Soc. C. E.

DIED JUNE 1ST, 1893.

Patrick J. Flynn was born at Tralee, Ireland, May 12th, 1838. At an early age he went to India, and entered the Roorkee Civil Engineering College, from which, in 1860, he was appointed to the Indian Public Works Department in the Punjab, as an Assistant Engineer.

In April, 1865, he was promoted to the position of Executive Engineer, and served until November, 1872. During this period he was engaged in the building of bridges, culverts, embankments on the Grand Trunk Road from Umballa to Rawalpindi, and the salt mines division at Pind Dadan Khan, in the Punjab.

Coming to the United States in 1873, he went to California, and was for the remainder of his life engaged in various engineering works, especially in irrigation, on which he became an authority.

In 1874-75 he was employed on the water supply service of San Francisco, and in 1876-77 as designing and constructing engineer in charge of the irrigation of Central California, at Fresno.

From 1878 to 1884 he was engaged on railway work, a portion of the time as Assistant Engineer on the San Francisco and North Pacific Railroad, and on the San Luis Obispo and Santa Maria Valley Railroad. He also designed and partly constructed the water works of the National Soldiers' Home, Santa Monica, Cal.

In 1890 Mr. Flynn became Engineer of the Tulare Irrigation District, and designed and executed their important works.

Mr. Flynn was an exceptionally competent and well-educated engineer, and had an extensive experience in India as well as on the Pacific coast. He published a number of works upon engineering subjects. The principal one, upon "Irrigation Canals," has had an extensive circulation and has been a valuable contribution to engineering literature.

Mr. Flynn became a Member of the American Society of Civil Engineers February 4th, 1891.

THOMAS MUTTER CLEEMANN, M. Am. Soc. C. E.*

DIED NOVEMBER 16TH, 1893.

Thomas Mutter Cleemann, son of Gustavus B. C. and Claramond (Colquhoun) Cleemann, was born in Philadelphia, Pa., July 31st, 1843. His father, who resided in Philadelphia for many years, was the son of a clergyman of the parish of Pernigle, near Riga in Livonia, one of the German provinces of Russia; but the family was of German origin, having existed for generations in the neighborhood of Guben in Prussia, from which place a branch went to Russia in 1725. His mother was a native of Petersburg, Va., and was of English and Scotch ancestry. Among the prominent early settlers of Virginia, from whom she was descended, may be mentioned Francis Mason, who came to the colony in 1613, and whose son, Colonel James Mason, was a member of the Governor's Council and of the House of Burgesses for Surry County; also, Lieutenant Colonel Walter Aston, one of the Aston family of Staffordshire, England, who settled in Virginia in 1627, and represented Shirley Hundred in the House of Burgesses; also Randall Holt, who came to Virginia in 1621.

* Memoir prepared by Jos. M. Wilson, Vice-President Am. Soc. C. E.

Thomas M. Cleemann received his early education at private schools, and at the age of fifteen years he entered the University of Pennsylvania, from which he graduated in 1862 with the degree of B. A. Having developed a special taste for mathematical pursuits, he selected civil engineering as his future profession, and with this object in view he went for one year to the Polytechnic College in Philadelphia, and after that for two years to the Rensselaer Polytechnic Institute at Troy, N. Y., from which he graduated in 1865 with the degree of Civil Engineer. His ability and high standing in his class brought him an offer of a college professorship, which, however, he declined, and he entered the service of the Pennsylvania Railroad Company in July, 1865, at Altoona, as Assistant Engineer under Chief Engineer W. Hasell Wilson. In 1866 he became Assistant Engineer on the Allegheny Valley Railroad, from which he returned to the Pennsylvania Railroad in 1867, remaining there until 1872.

In 1872 he was sent by his intimate friend, the late W. W. Evans, M. Am. Soc. C. E., to Peru, South America, in special charge of the erection of the first Verrugas Viaduct, but, taking a low fever, prevalent in that section of the country, he was unable to do anything in connection with the bridge, and it was not until after several months that he could resume engineering employment, which he did as Division Engineer on the Callao, Lima and Oroya Railroad.

Mr. Cleemann left South America in 1873, and made an extended tour in Europe. In 1875-76 he was engaged as Principal Assistant Engineer under Messrs. Henry Pettit and Joseph M. Wilson on the Main Exhibition Building and Machinery Hall of the Centennial Exhibition, and in this capacity worked out the details of some of the important construction connected with these buildings.

He again went to South America in 1876 as Engineer of the Southern Railroad of Chili, but his absence was only of short duration, and he returned the same year, taking a position in connection with the Water Department of the City of Philadelphia, which he held until 1879.

In 1880 he accepted the position of Resident Engineer of the Richmond and Allegheny Railroad in Virginia, and, following this, he became engaged in a general consultation and inspection practice until May, 1893, when he went for a third time to South America, taking for a period of six months the position of Municipal Engineer to the city of Guayaquil, in Ecuador.

Mr. Cleemann wrote and published in 1880 a small volume entitled "The Railroad Engineer's Practice," giving "a complete description of the duties of the young engineer in preliminary and location surveys, and in construction," a work which passed through three editions in four years, increasing in size each time. A fourth edition was issued in 1892 to serve as a text book to a course of lectures delivered by him

at the Rensselaer Polytechnic Institute in that year, when he temporarily filled a vacancy in the Faculty. Mr. Cleemann also contributed from time to time sundry original articles and reviews on professional subjects to the various engineering magazines. He had an especial taste for genealogies, and made an exhaustive study of the families in the counties of Virginia bordering on the lower James River, particularly in Surry, where resided his earliest American ancestors, and in connection with these researches he made the interesting discovery of a John Washington, ancestor to a family distinct, at least in this country, from that of the John Washington, ancestor of President Washington, a fact of considerable value as clearing up some confusion which had existed concerning the genealogy of the latter. A communication from him in reference to this discovery was published in the *New England Genealogical Magazine* (Vol. XLIV, p. 307).

Mr. Cleemann was a member of the American Society of Civil Engineers (elected Oct. 1st, 1879); of the Rensselaer Society of Engineers; member and past president of the Engineers' Club, of Philadelphia; member of the American Philosophical Society; of the Historical Society of Pennsylvania; the Genealogical Society of Pennsylvania, and of other societies.

On Thursday, November 9th, 1893, the day before the termination of his six months' engagement at Guayaquil, and just as he was about returning home, he was taken ill with what proved to be that much-dreaded malady, yellow fever. According to the account of his friend, who stood faithfully by him through all, he bore his sufferings with wonderful fortitude and patience; but, notwithstanding his vigorous constitution, his tranquility, fearlessness and courage, his every effort to aid in a recovery, and the utmost devotion of his friends and his physician, the disease followed its dire course to the end, and after seven days of heroic suffering he sank gradually as a child goes to its sleep, and passed quietly away at a quarter past four on Thursday afternoon, November 16th.

That night, about 7 o'clock, in the Protestant churchyard, on a hill overlooking the town, what remained of our friend and fellow member was laid to its rest, attended by the few friends and foreigners who could hastily gather together, the American Consul reading the impressive Episcopal Church service for the dead. At their feet lay the city in the gathering darkness; above was the clear, beautiful southern sky, brightly studded with stars, and around them the gentle breezes sighed mournfully through the palm trees in unison with the grief of the living. To those who stood there it was a scene and occasion never to be forgotten.

Thus passed away one whom to know was to love, to lose was to sincerely mourn. His refined, sweet, gentle nature, his upright and courtly manners, his cultured mind, will all be long remembered by

his friends. An engineer of education and experience, careful and intelligent in his work, not hesitating to express his opinions, yet never insisting upon their acceptance by others, always preserving a quiet, gentle dignity befitting the gentleman; it were better that more such existed in our profession, and it is sad, indeed, to lose so precious an example of what we should be.

"Requiescat in pace."

GORHAM P. LOW, M. Am. Soc. C. E.*

DIED JANUARY 8TH, 1894.

Mr. Low was born in Gloucester, Mass., spent his boyhood there, and always claimed Gloucester as his home. He was a student at the Lawrence Scientific School of Harvard University, and left the University to enlist in the army, serving with Company G, Eighth Regiment, Massachusetts Volunteers, in the early part of the War of the Rebellion.

Mr. Low's earliest practice was as an assistant on surveys for the Troy and Greenfield Railway and Hoosac Tunnel. Among his other railway experiences were engagements as Assistant Engineer on the New York and New England Railway; on the construction of the St. Paul Union Depot in Minnesota, and the trackage connected therewith; as Engineer of Maintenance of Way, and later as Superintendent of the Norfolk and Elizabeth Railway in Virginia; in charge of a locating party for the Puget Sound Extension of the Southern Pacific Railway, and an engagement is reported also with the Boston, Revere Beach and Lynn Railway in Massachusetts.

He was also professionally engaged with the Gloucester Street Railway and the York Beach Railway in Massachusetts. Mr. Low had several engagements with the New York and New England Railway. Among them, in 1880, he prepared foundations for a grain elevator and a warehouse covering nearly three acres area, and other improvements at the South Boston Terminal. In 1881 he was superintendent of construction of the extension of the same railway from Waterbury, Conn., to Fishkill, N. Y., and afterwards on inspecting and strengthening bridges on the older parts of the road. He was also engaged on surveys for the Plattsmouth railway bridge over the Missouri River,

* Memoir prepared by John T. Fanning, M. Am. Soc. C. E.

and on the construction of deep foundations for the same with Mr. George S. Morison, Chief Engineer.

His hydraulic practice included engagements with James B. Francis, Hiram F. Mills and J. T. Fanning, and also at Fall River and other places. He was also engaged on the United States Government Surveys for the Illinois and Mississippi Canal under General James H. Wilson, U. S. A.

Mr. Low also acted as Assistant Engineer in the construction of the public water supplies of St. Louis, Mo.; Columbia, S. C.; Pittsburgh, Pa.; Wooster, O., and on the additional water supply of Boston. He prepared an elaborate report on the construction of a public water supply for the Dalles, in Oregon, and was also employed on the Pacific Coast in the construction of a reservoir having an asphalt lining. He was Assistant Engineer on the Boston Water Works at South Framingham, Mass., in charge, 1876 to 1879, of construction of the Sudbury River dams and reservoirs. In part of this work there was much trouble with quicksand, and Mr. Low acquired an experience which made his opinions much sought after by other engineers having difficulties of this character.

Mr. Low was for a short time interested in an industrial enterprise.

His last professional engagement was with the Board of Public works of the city of Austin, Texas, where he had charge of difficult and important work on the Austin water power. He had been engaged about six months on this latter work, when, on Christmas Day of 1893, he had a paralytic stroke from which he never rallied. He died at Austin on the 8th day of January, 1894.

The Board of Public Works of Austin expressed their regards for him and confidence in his ability by a resolution, as follows:

“Resolved, That during the six months Mr. Low was employed by the Board of Public Works he not only demonstrated his superior qualifications as a civil engineer, but by his gentlemanly manners he endeared himself to every member of the Board, and we regard his death, not only as a great loss to the engineering profession, but also as a great loss to all who enjoyed his personal acquaintance, and especially to the city of Austin.”

Mr. Low came from a prominent old Gloucester family, being a son of Gorham P. and Mary Letitia Low. He was never married, and neither brothers nor sisters survive him. He was elected a Member of the American Society of Civil Engineers, April 21st, 1869, and was about 48 years of age when he died.

His acquaintances have uniformly spoken of him as being kind, frugal, faithful, skillful in his profession, and as a man of sterling integrity.

WILLIAM HERMAN LOTZ, M. Am. Soc. C. E.*

DIED JANUARY 31st, 1894.

William Herman Lotz, born October 31st, 1838, in Marburg, Province of Hessen, Prussia, was the eldest of 12 children whose parents were Louis Lotz and Hermine Cranz Lotz. He was a descendant of an old and well-known family that had possessed mills in Marburg for many generations.

He received his education in the common schools of his native province, and finished his course of study in the higher schools at the age of sixteen, graduating with honors. Having heard many stories of the riches to be acquired in the wonderful country of America, he obtained the consent of his father (his mother having died recently) to emigrate. It was his intention to become a merchant, and landing in New York he soon obtained a position with a large importing house in that city. Experience, however, taught him that he had no talent for barter, and at the end of six months he returned to his home with the intention of devoting some years to the practice and study of machine construction. His father, being in good circumstances, apprenticed him to Henschel & Son, machine builders, of Cassel, Germany, paying a large premium so that his son might advance rapidly; and also arranged matters so that his son might have every opportunity to study engineering during his leisure hours. William took advantage of his father's kindness and finished his apprenticeship in one year, having also made great progress in the theoretical study to which he had applied himself, and for which he had always shown much talent. His father now wished him to take an active part in the management of their own mills, but William had no inclination to remain in Germany, as it had always been his firm determination to return to the United States, for he realized that the field offered him there was a larger one for an active young man. He therefore left home and went direct to London. Having no money and finding no employment he suffered many hardships, until his father sent him sufficient means to defray his expenses for the trip across the ocean.

Arriving in New York City, in 1860, he immediately bent his steps in the direction of Richmond, Va., where he had an uncle. In this city he secured the position of draughtsman with the Tredegar Iron Works. He had not been here long when the Civil War broke out, and the Tredegar Iron Works were remodeled for the manufacture of heavy ordnance. It was the young man's intention, owing to his many friends, to enter the Confederate army, but he was deterred from doing

* Memoir prepared by Mr. Arthur C. Lotz.

this by his chief, General Anderson, who, appreciating his diligence and capabilities, advised him not to enlist, for if he did he would be detailed for the ordnance department, and might as well draw a large salary for his work, rather than a soldier's pay. The advice was followed and Mr. Lotz simply joined the Home Guards and remained with the Ordnance Department. He was rapidly promoted, and when ordered to Nashville, Tenn., in 1862, had become one of the chiefs of the department. During his stay in Richmond he designed the best guns in the possession of the Confederacy, and also made many improvements in the manufacture thereof.

In Nashville, he was associated with a Mr. Bronned, for the construction of gunboats for his government, and also for the testing of cannon. Before, however, accomplishing much in this direction Nashville fell into the hands of the Union forces. Applying for service he was next ordered to Alabama, to take charge of the munition works and blast furnaces of that division. He remained there until 1864, constructing, during his stay, machinery for the manufacture of small arms, and also many blast furnaces, among the latter those located where Birmingham now stands. Everything, however, was destroyed in 1864 by General Wilson and the Union forces, and Mr. Lotz made his way back to Richmond as best he could. Remaining in Richmond a short time, and realizing that the Confederate cause was a lost one, he bade his old friends good-by, broke through the lines and made his way north to Chicago, where he arrived in the beginning of 1865.

In Chicago he obtained the position of Assistant Master Mechanic of the Chicago and Galena Railroad, where he remained until the death of his father called him to Europe early in 1866.

Returning to Chicago, after a short sojourn abroad, he established himself as a mechanical engineer, and later, also, as solicitor of patents, and expert in patent causes, in both of which lines he had remarkable success, being acknowledged one of the best authorities on machinery in the West. Between the years 1868 and 1880 he invented many appliances for heating and ventilation, and also for the manufacture of special machinery, and improvements in machinery for the manufacture of bricks.

In 1879 he associated himself with Mr. Edward Baumann, architect, also of Chicago, the purpose of the partnership being the design and erection of grain elevators, a subject to which both had devoted much time and study. Between the years 1879 and 1884 were designed and erected, under their supervision, the Armour Dole Elevator "D," having a capacity of 2 000 000 bushels; the Rock Island Elevator "A," Chicago, having a capacity of 1 500 000 bushels; the Mobile Elevator, Alabama, capacity, 700 000 bushels; the Akron Elevator, Akron, O., capacity, 300 000 bushels. Plans were made also for the Weehawken, N. J., Elevator, which was to be built by the Weehawken and

New Jersey Railroad, to have a capacity of almost 3 000 000 bushels. Owing, however, to the failure of the railway company, this large elevator was not built. Numerous small elevators were built within the next few years. Experts pronounce the elevators built by the firm of Baumann & Lotz to be the best arranged and constructed in the world.

Shortly before the death of Mr. Baumann, which occurred in 1887, the firm, together with others, organized a company for the purpose of introducing and building malt houses according to the system of Mr. Jules Saladin, of Nancy, France. The company was styled the Saladin Pneumatic Malting Construction Company, and the following plants, with the exception of the first (the erection of which was supervised by Baumann & Lotz), were engineered singly by the subject of this biography, to wit: One for the L. C. Huck Malting Company, Chicago, capacity, 400 000 bushels; one for the William Buchheit Malting Company, Watertown, Wis., capacity, 250 000 bushels; one for the Buffalo Brewing Company, Sacramento, Cal., capacity, 60 000; one for the Donau Brewing Company, Tacoma, Wash., capacity, 125 000; one for the Pabst Brewing Company, Milwaukee, Wis., capacity, 700 000; one for the San Francisco Brewing Company, Limited, San José, Cal., capacity, 500 000 bushels; one for George Rochevot, Buffalo, N. Y., capacity, 150 000 bushels; one for the City Brewery, Portland, Ore., capacity, 500 000 bushels; one for the Wisconsin Malt and Grain Company, Appleton, Wis., capacity, 200 000 bushels. Mr. Lotz, being in ill health from the fall of 1892, retired from active interest in the Saladin Pneumatic Malting Construction Company, and his illness continued until his death, which occurred January 31st, 1894. He became a Member of the American Society of Civil Engineers September 1st, 1875. He was also a member of the Western Society of Engineers, and the Association of Engineering Societies.

William H. Lotz was married May 24th, 1866, to Miss Georgine Heinemann, eldest daughter of August and Augusta Heinemann, of Chicago, who survives him. The issue of this marriage is seven children, three sons and one daughter of whom are living.

ABRAHAM GOTTLIEB, M. Am. Soc. C. E.*

DIED FEBRUARY 9TH, 1894.

Abraham Gottlieb was born June 17th, 1837, in the village of Taus, in Bohemia, Austria, at which place his father was a merchant, and where he attended the parish school until he was about ten years of

* Memoir prepared by M. J. Becker, Past President, M. Am. Soc. C. E., and C. L. Strobel, M. Am. Soc. C. E.

age. At that time his father sent him to Pilsen, in order to prepare for a university course. He entered the lower branch of the University of Prague at the age of sixteen, and graduated from the University proper at the age of twenty-four. He was at once engaged as engineer on the Kaiser Francis-Joseph Railroad, then in process of construction, and remained with this road until his removal to the United States. He was married to Rose Pollak on April 16th, 1866, and resigned his position on the Kaiser Francis-Joseph road a month later, before which time he had been promoted to the position of principal assistant to the Chief Engineer of Construction. He arrived in the United States in June, 1866, locating at Chicago, Ill. His first employment was with Mr. August Bauer, an architect of Chicago, with whom he remained but a few months, then taking a position with Mr. L. B. Boomer, the well-known bridge contractor. He remained in this position until the organization of the American Bridge Works in 1868, of which concern he was appointed Chief Engineer.

In 1873 he accepted the position of Western Agent of the Keystone Bridge Company of Pittsburgh, Pa., and occupied that position until the summer of 1877, when, upon the retirement of Mr. J. H. Linville, he was elected President, which caused his removal to Pittsburgh. He resigned his position with the Keystone Bridge Company in December, 1884, and returned at once to Chicago, where he succeeded to the business of E. Hemberle & Co., engaging in a general contracting business, and at the same time acting as Consulting Engineer and Western Agent of the Edgemoor Bridge Works for a number of years. This latter relationship was terminated in 1892.

During Mr. Gottlieb's connection with the Keystone Bridge Company, many important contracts were taken, among which may be mentioned the Susquehanna River Bridge, for the Baltimore and Ohio Railroad, at Havre De Grâce; the Point Pleasant Bridge over the Ohio River, for the Ohio Central Railway; the Plattsburgh Bridge over the Missouri River, for the Burlington and Missouri River Railway, the first steel truss bridge erected in America; the Missouri River Bridge at Blair Crossing, Nebraska; the New River Viaduct for the Cincinnati Southern Railway; the Monongahela River Bridge at Pittsburgh, for the Pittsburgh, Chicago and St. Louis Railway; the Madison Avenue Bridge, New York City; the train shed of Broad Street Station, Pennsylvania Railroad, Philadelphia; the Exposition and Mining Building of the Mexican Government for the New Orleans Exposition; the Sixth Avenue Elevated Railroad, New York City, and the Franklin Square Bridge in the New York approach to the East River Bridge, New York City.

After his return to Chicago he built the iron work for the Masonic Temple, the Tattersall Horse Market, the Administration Building and the Fine Art Building for the Columbian Exposition, and other build-

ings. He was the first Chief Engineer of the Columbian Exposition, but, owing to a conflict in authority with others, he resigned after more than a year of active service in that capacity.

Mr. Gottlieb became a Member of the American Society of Civil Engineers on September 4th, 1872, and at the time of his death he was one of the Directors of the Society, having been elected for a three years' term at the annual meeting in January, 1892.

Mr. Gottlieb was one of the incorporators and original charter members of the Engineers' Society of Western Pennsylvania at the time of its organization in 1880; was elected its President in 1882, and re-elected in 1883.

He also became a member of the Western Society of Engineers, of Chicago, in 1878, and was elected President of that Society on January 3d, 1888, serving for a term of one year.

On the afternoon of February 9th, 1894, shortly after attending to some business in the Treasurer's office of the Illinois Steel Company, in the Rookery Building, Chicago, he suddenly fell, and expired before medical assistance could reach him; he was buried on Sunday, February 11th, in Rose Hill Cemetery. He leaves a widow and seven children (four daughters, two of whom are married, and three sons).

LIST OF MEMBERS.

ADDITIONS.

MEMBERS.	Date of Membership.
COLE, JOHN ADAMS.....167 Dearborn st., Chicago, Ill.....	March 7, 1894
GARRISON, EVERETT .....Chief Engineer N. D. & C. R. R., Newburgh, N. Y. ..	March 7, 1894
ISAACS, JOHN DOVE.....Fourth and Townsend Sts., San Francisco, Cal.....	March 7, 1894
PASCHKE, THEODORE.....Room 717, Havemeyer Bldg., New York City	March 7, 1894
WHEELER, GEORGE MONTAGUE...930 16th St., N. W., Washington, D. C.....	March 7, 1894

ASSOCIATE MEMBERS.

COOLEY, MAURICE MERTZ.....Engineer Maintenance of Way, T. & O. C. Ry., Toledo, O.	March 7, 1894
HAYCROFT, JAMES ISAAC .....Fontenoy, Ocean St., Woolahra, Sydney, N. S. W., Australia	March 7, 1894

McMEERIN, CHARLES WILLIAM	Chief Engineer D. M. & N. W. Ry., 851 4th St., Des Moines, Ia.	{ J. April 2, 1890 Assoc M. March 7, 1894
MITCHELL, HORACE HULBRUD	20 Ninth Ave., Newark, N. J.	March 7, 1894
SAVAGE, HIRAM NEWTON	National City, Cal.	March 7, 1894

ASSOCIATES.

DRUMMOND, HORACE JOSEPH	Drummond, McCall & Co., Montreal, Canada	March 6, 1894
YOUNG, CHARLES GRIFFITH	6 West Read St., Baltimore, Md.	March 6, 1894

JUNIORS.

ANDERSON, JAMES PRINCE	New Jersey Steel and Iron Co., Trenton, N. J.	March 6, 1894
EASTWOOD, JOHN THOMPSON	308 North St., Portsmouth, Va.	March 6, 1894
ELLIS, DAVID LUMLY	Box 383, Oil City, Pa.	March 6, 1894
EVANS, PETER PLATTER	Assistant Engineer C. L. & W. Co., Brooklyn Village, O.	Feb. 6, 1894
MASON, GEORGE COTNER	University City of New York, Washington Square, New York City	March 6, 1894
TUSKA, GUSTAVE ROBITSCHER	Columbia College, New York City	March 6, 1894

CHANGES AND CORRECTIONS.

MEMBERS.

AULLS, H. L.	1629 Ogden St., Denver, Colo.
BALDWIN, FRED. H.	Pejepscot, Me.
BECKLER, E. H.	1329 Wilton Ave., Chicago, Ill.
BELL, HENRY P.	Victoria, B. C., Canada.
BILLIN, CHARLES E.	(Care Fraser & Chalmers), 2 Wall St., New York City.
BREITHAUP, W. H.	Berlin, Ontario, Canada.
DUNHAM, H. F.	50 Lake Erie St., Massillon, O.
ELMER, HOWARD N.	1114 Monadnock Bldg., Chicago, Ill.
GRANT, E. W.	114 North Seminary St., Galesburg, Ill.
KASTL, ALEX. E.	3541 Daly St., Brighton Park, Chicago, Ill.
KELLEY, WILLIAM D.	718 Havemeyer Bldg., New York City.
KIRTLAND, A. P.	215 Craig St., Pittsburgh, Pa.
LIBBEY, E. D.	6726 Virginia Ave., St. Louis, Mo.
MANN, GEORGE E.	274 Main St., Buffalo, N. Y.
McNAIR, THOMAS S.	Engineer Union Improvement Co., Hazleton, Pa.
MINOT, S. L.	120 Tremont St., Boston, Mass.

PRICE, PHILIP M.	Captain Corps of Engineers, U. S. A., Office U. S. Light House Board, Washington, D. C.
ROSENZWEIG, ALFRED	Guanajuata, Mexico.
SCHAUB, J. W.	127 East 23d St., New York City.
STONE, E. H.	District Engineer East India Ry., Asansol, India.
TOMLINSON, A. T.	18 Sidney Place, Brooklyn, N. Y.
WARD, CHARLES D.	26 Cortlandt St., Room 717, New York City.
WILLIAMSON, W. G.	723 Monroe St., Montgomery, Ala.

ASSOCIATE MEMBERS.

ERLANDSEN, OSCAR.	172 Centre St., New York City.
SISSON, W. L.	219 E. Lafayette Ave., Baltimore, Md.
WERNER, E. A.	222 Clarence Ave., Lake View, Chicago, Ill.

ASSOCIATES.

CARD, JOSEPH P.	South Englewood, Ill.
LEWIS, F. C.	Chief Engineer Pottsville Iron and Steel Co., Pottsville, Pa.
STONE, WATERMAN.	D. & W. Street Ry. Co., North Dartmouth, Mass.

JUNIORS.

COXE, E. H.	Sunday Creek Coal Co., Corning, O.
JEWETT, WM. B.	19 Bright St., Northampton, Mass.
KNAPP, H. M.	1709 1st St., Louisville, Ky.
KOBAYASHI, K.	Yodobashi Water Works, Tokyo, Japan.
MARTIN, WISNER B.	126 East 34th St., New York City.
MILLER, R. P.	806 East Leigh St., Richmond, Va.
SAMUELSON, A. B.	305 Henry St., New York City.
SHALER, IRA A.	50 Broadway, New York City.
SMITH, PEMBERTON.	9 German Insurance Bldg., Buffalo, N. Y.
WAGNER, JOS. W.	School House Lane, Germantown, Philadel- phia, Pa.
WILKINS, GEORGE S.	6 South Dod St., Princeton, N. J.

RESIGNATION.

JUNIOR.

PIERSON, STEPHEN C.	Date of Resignation. January 1, 1894
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DEATH.

CAMPBELL, ALLAN	Elected Member February 19th, 1868; Hon- orary Member, March 1st, 1892; died March 18th, 1894.
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ADDITIONS TO LIBRARY AND MUSEUM.

- From Fred. L. Alles, Secretary, Los Angeles, Cal.:
Official Report of the International Irrigation Congress, October, 1893.
- From Horace Andrews, Albany, N. Y.:
Annual Report of the City Engineer of Albany, N. Y., for year ending December 1st, 1893.
- From Board of Railroad Commissioners of Massachusetts:
Twenty-fifth Annual Report, January, 1894.
- From Board of Railroad Commissioners of New York:
Eleventh Annual Report, for 1893.
- From Board of Trustees of the Sanitary District of Chicago:
Proceedings. February 14th, 21st, 28th.
- From George Bowers, Lowell, Mass.:
Twenty-first Annual Report of the Lowell Water Board, for 1893.
- From R. C. P. Coggeshall, New Bedford, Mass.:
Transactions of the New England Water Works Association, 1883, 1834.
Journal of the New England Water Works Association. Vol. 1 to 7, inclusive. 1886-1893.
- From S. C. Ellis, Boston, Mass.:
Annual Report of the Board of Survey for the year 1893.
- From Theodore N. Ely, Philadelphia, Pa.:
On Methods Used and Results Obtained in Making Germicidal-Efficiency Tests of a Disinfectant for Use in Railway Sanitation.
- From Engineering Association of New South Wales, Sydney, N. S. W.:
Report of the Department of Public Works, for 1892.
- From Rudolph Hering, N. Y.:
Report and Recommendations on the Sewer System of the City of Colorado Springs.
Report of the Joint Committee on Water System, etc., of the City of Colorado Springs.
Report of the Water Supply of the City of Tacoma, 1892.
Annual Report of the Board of Public Works of the City of Superior, Wis., February 1st, 1893.
Report upon a System of Sewerage for the City of Ironton, O.
Report upon a Sewerage System for the City of Sioux Falls, S. D., January, 1893.
Report upon an Additional Water Supply for Waterbury, Conn., May, 1892.
Annual Report of the City Engineer of Springfield, Mass., December 10th, 1891.
Second Annual Report of Board of Public Works, Indianapolis, Ind., for 1892.
- From G. Th. Hoech, Washington, D. C.:
Trogtschleusen in senkrechten Hebeugen und auf quergeneigten Ebenen.
- From J. W. Howard, N. Y.:
Natural Asphaltum and its Compounds.
- From Iron and Steel Institute, London, Eng.:
Journal. Vol. XLIV.
- From Luigi Luiggi, Genoa, Italy:
Su alcune Macchine per la preparazione del Calcestruzzo proposte per i Lavori dei Bacini di Raddobbo nel Porto di Genova.
Terzo Congresso Internazionale di Navigazione Interna.
I Porti di Hull, di Grimsby e di Goole sul Fiume Humber.
L'isola di Cipro.
Il Servizio merci sulle Ferrovie Inglesi.
Sull'ordinamento del Porto di Anversa.
Il Porto e i Docks di Southampton.
La nuova Ferrovia Elettrica Sotteranea di Londra.
Nuovi Tipi di Gru idrauliche mobili.
Sul Faro a Luce Elettrica dell'isola del Tino.
- From Massachusetts Institute of Technology, Boston, Mass.:
Annual Report of the President and Treasurer, December 13th, 1893.
Annual Catalogue, 1893-1894.
- From Edward S. Morse, Salem, Mass.:
Latrines of the East.
- From Patent Office, London, Eng.:
Abridgment of Specifications, Class 14, Beverages.
- From State Agricultural College, Fort Collins, Col.:
Sixth Annual Report of the Agricultural Experiment Station.
- From Technical High School, Aix-la-Chapelle, Germany:
Friedrich der Grosse als Bauherr.
- From U. S. Bureau of Education:
Catalog of "A. L. A." Library at the World's Columbian Exposition.
- From U. S. Coast and Geodetic Survey:
Annual Report for 1891.
- From U. S. Department of State:
Special Consular Reports. Olive Culture in the Alpes Maritimes.
Vagrancy and Public Charities in Foreign Countries.
Consular Report, No. 162, March, 1894.
- From U. S. Navy Department:
Exhibit at the World's Columbian Exposition, 1893.
- From U. S. War Department, Chief of Ordnance:
Notes on the Construction of Ordnance, No. 64, Smokeless Powder.
- From M. E. Wadsworth, Houghton, Mich.:
A Paper on the Michigan Mining School.
- From Herbert M. Wilson, Washington, D. C.:
Engineering Results of Irrigation Survey.

BOOK NOTICE.

SEWAGE DISPOSAL IN THE UNITED STATES.

By George W. Rafter, M. Am. Soc. C. E., and M. N. Baker, Ph. B.
7 x 10 ins., cloth, pp. xxvii + 598. With illustrations. D. Van Nostrand
Company, New York, 1894.

The subject of the proper disposal of sewage is one of comparatively recent origin in the United States, but is one to which increased attention is being given every day by engineers in private practice and by municipal authorities everywhere. It is so intimately connected with everything pertaining to the personal, as well as the general, health, and to agriculture, that anything bearing upon the subject ought to be a matter of interest.

The issue of any book treating fully this question (which in many respects is one of the most important before the public, and demanding the closest investigation), needs no apology from the author or publisher; for whether the book contains the latest and fullest results of observation or not, it must embrace something that will be of value to those interested.

"Sewage Disposal in the United States," claims to embrace the most recent researches and to give a mass of information not obtainable elsewhere. The aim of the authors has been to present as clearly as possible the best attainable information on all the different branches of their subject, and they have compiled, from many sources and from original examination, much that will be of undoubted benefit and interest to engineers.

The authors do not lay much claim to originality in the book, but the quoted articles are, in many cases, from reports difficult of access and very rare, and compensate for the lack of original material. In the preface, the origin of the work is given, and an explanation of the joint authorship. "In the fall of 1891, Mr. Rafter, at the request of the publishers, D. Van Nostrand Company, undertook the preparation of a Manual of Sewage Disposal in the United States. Early in 1892, Mr. Baker began the collection, largely by personal visits to existing purification works, of data in regard to executed works as the basis of a series of articles in *Engineering News*. Neither was aware of the work of the other until about July 1, 1892, at which time Mr. Rafter had nearly completed the task to which he had set himself, while Mr. Baker was just beginning the series of articles on executed works which have since appeared in the journal named. A comparison of data indicated that Mr. Baker's work on the executed projects, by reason of bringing the information more nearly down to date, would add to the completeness of the book, and accordingly arrangements were made for joining forces."

In its scope the book embraces the Germ Theory of Disease; Diseases caused by Impure Water; Infectious Diseases of Animals; Pollution and Purification of Streams; General Sewage Disposal; Broad and Sub-Surface Irrigation; Disposal of Waste and General Descriptions of Sewerage Works. The work is too large for general reading, but it will be of value, as we have said, to engineers, sanitary authorities and municipalities.

American Society of Civil Engineers.

PROCEEDINGS.

Vol. XX.—April, 1894.

MINUTES OF MEETINGS.

(Abstract of such as may be of general interest to Members.)

OF THE SOCIETY.

APRIL 4TH, 1894.—The Society met at 20 o'clock, President William P. Craighill in the chair; F. Collingwood, Secretary; and present, also, 71 Members and 7 visitors. Ballots were canvassed, and the following candidates were declared elected: As Members—Daniel Dawson Carothers, Cincinnati, O.; George Goodell Earl (elected Junior May 7th, 1890; elected Associate Member December 2d, 1891), New Orleans, La.; Henry Read Leonard, Philadelphia, Pa.; George Thomas Prince, Haddonfield, N. J.; Joseph Thomas Richards, Philadelphia, Pa. As Associate Members—William Williams Crehore, New York City; Robert Walter Creuzbaur (elected Junior April 2d, 1890), New York City; Burton Rogers Felton, Marlboro', Mass.; Otis Ellis Hovey, Chicago, Ills.; Julian de Bruyn Kops, Savannah, Ga.; Walter Reuben Marden, Pittsburgh, Pa.; Alexander Rice McKim, New York City; Arthur Edwin Poulston, New York City; Pemberton Smith (elected Junior March 31st, 1891), Albany, N. Y.

Announcement was made of the election, by the Board of Direction, of one Associate and five Juniors.

Edward P. North, M. Am. Soc. C. E., presented the following, which was adopted.

Whereas, The State Engineer is now co-operating with the United States Geological Survey in making an accurate topographical map of the State of New York, which will be of great use to Engineers and

others interested in the development of the State's resources. And as there is now no map of the State which is correct as to position, and no map giving reliable topographical information of any kind; and

Whereas, After full consideration, appropriations for the work have been made by previous legislatures, and a moderate additional yearly amount is required for its prosecution until completion;

Resolved, That it is the sense of this meeting of the American Society of Civil Engineers that the continuation of the present energetic prosecution of the work is desirable, and should not be allowed to lapse through lack of sufficient appropriations.

A paper by Fr. von Emperger, Member of the Austrian Society of Engineers and Architects, on "The Development and Recent Improvement of Concrete-Iron Highway Bridges," was presented, and was discussed by Messrs. Joseph M. Wilson, Craighill, Crowell, George Hill, Just, O'Rourke, Poulson, Triest, Bogart, Gosling, and the author.

APRIL 18TH, 1894.—The Society met at 20 o'clock, J. Foster Flagge, M. Am. Soc. C. E., in the chair; F. Collingwood, Secretary; present, also, 65 Members and 5 visitors.

Announcement was made of the following deaths: Henry Clay Jennings, elected Member April 6th, 1887; died March 13th, 1894. Joseph Hill Paddock, elected Member October 5th, 1892; died April 4th, 1894.

A paper by A. A. Schenck, M. Am. Soc. C. E., on "The Relation of Wheels to Frog Points and to Guard Rails," was presented by the author. A written discussion from M. J. Becker, Past-President Am. Soc. C. E., was read by the Secretary, and the subject was discussed orally by Messrs. Prout, Nichols, Hardy, H. W. Brinckerhoff and Bogart.

A paper by William Lee Sisson, Assoc. M. Am. Soc. C. E., on "Harper's Ferry Improvement," was presented by the Secretary.

OF THE BOARD OF DIRECTION.

APRIL 3D, 1894.—The Board met at 20 o'clock, nine Members present.

The President announced the appointment of a new Committee on "Units of Measurement," as follows: E. A. Fuertes, Geo. M. Bond, William Murray Black, Robert E. McMath, and George F. Swain.

The arrangements for the Annual Convention were considered.

Action was taken in regard to Members in arrears.

Applications were considered and other routine business transacted.

The following applicants were elected: As Associate—John Parry Johnston. As Juniors—Wallace Greenalch, Albert Lloyd Hopkins, Willard Datus Lockwood, William McGehee Wallace, Thomas Jefferson Wilkenson.

MEMOIRS OF DECEASED MEMBERS.

FRANK A. LEERS, M. Am. Soc. C. E.

DIED MAY 19TH, 1890.

Frank Adolph Leers was a native of Germany, having been born at Gronau, in Rhenish Prussia, July 29th, 1844. At the age of sixteen he became an apprentice in an iron foundry, where he remained two years. In 1863 he entered the high school at Düren, and after a year's study passed the examination required for graduation. He then entered the industrial college at Cologne, graduating from there in 1864.

After passing two years with a manufacturing company at Düren as draftsman and constructor of machinery, Mr. Leers, in 1867, entered the Polytechnic School at Karlsruhe, where he took a full course of instruction in mechanical engineering. After graduation he was offered the position of constructing engineer in charge of the smelting works of the Société Anonyme de la Vieille Montagne, at Moresnet, Belgium.

Mr. Leers came to the United States in 1871, and, going to Missouri, was employed for different periods at the Frumet Lead Mines, Jefferson County, Mo.; Eagle Foundry, St. Louis; the Mayer Iron Company, Bessemer, Ill.; and on the St. Louis bridge. In 1878 he was employed on the geological survey of Mine La Motte, in Missouri.

In 1879-80 he was assistant engineer on the superstructure of the New York Elevated Railroad and the Brooklyn Elevated Railroad, and in 1880 engineer of the Passaic Rolling Mill Company, Paterson, N. J. He remained in this latter position until the time of his death. Mr. Leers became a Member of the American Society of Civil Engineers May 4th, 1887.

ANDREW DEMPSTER WHITTON, M. Am. Soc. C. E.

DIED FEBRUARY 23D, 1892.

Mr. Whitton was a Scotchman by birth, having been born in Dundee, March 6th, 1856. When about twenty years of age he entered the employment of the British and Spanish Mercantile Marine, as a mechanical engineer, in the East and West Indian service. He

others interested in the development of the State's resources. And as there is now no map of the State which is correct as to position, and no map giving reliable topographical information of any kind; and

Whereas, After full consideration, appropriations for the work have been made by previous legislatures, and a moderate additional yearly amount is required for its prosecution until completion;

Resolved, That it is the sense of this meeting of the American Society of Civil Engineers that the continuation of the present energetic prosecution of the work is desirable, and should not be allowed to lapse through lack of sufficient appropriations.

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ANDREW DEMPSTER WHITTON, M. Am. Soc. C. E.

DIED FEBRUARY 23D, 1892.

Mr. Whitton was a Scotchman by birth, having been born in Dundee, March 6th, 1856. When about twenty years of age he entered the employment of the British and Spanish Mercantile Marine, as a mechanical engineer, in the East and West Indian service. He

remained in that position until 1882, when he came to the United States, and became an assistant engineer on the Union Pacific Railway.

In 1884 he went to Philadelphia, as Chief Engineer of the Philadelphia Traction Company.

Mr. Whitton was a very successful engineer in the construction of cable railways. Among others, he designed and constructed roads for the Pittsburgh Traction Company, Pittsburgh, Pa.; North Chicago Street Railway Company, Chicago, Ill.; West Chicago Street Railway Company, Chicago, Ill.; Philadelphia Traction Company, Philadelphia, Pa.; and Baltimore Traction Company, Baltimore, Md. He was Chief Engineer of the last-named company at the time of his death.

Mr. Whitton became a Member of the American Society of Civil Engineers May 7th, 1891.

WENDELL R. CURTIS, M. Am. Soc. C. E.

DIED MARCH 7TH, 1893.

Wendell R. Curtis was born in Abington, Mass., in 1850. After his preliminary education, he became a student at the Rensselaer Polytechnic Institute, Troy, N. Y. He left there in June, 1869, and practiced surveying in South Boston and Lynn, Mass., until May, 1873, when he was appointed U. S. Assistant Engineer, under General Theodore G. Ellis, in charge of the improvement of the Connecticut River, Hartford, Conn. While there he was engaged in surveys of the Connecticut River, Block Island Harbor, Newport and Buzzard's Bay, and had charge of the improvements at these places.

In 1880 Mr. Curtis went to California, where he made surveys of the harbor of San Diego, and was afterwards appointed Assistant Engineer on the California Southern Railroad, in charge of bridge construction.

Returning to Massachusetts in 1882, he assumed charge of engineering work at Newport, R. I., and Swampscott, Mass., and remained for a year, when he again went South, in charge of the improvement of Savannah River and harbor. He remained in Georgia, in charge of various public works, until the date of his death.

Mr. Curtis became a Member of the American Society of Civil Engineers June 4th, 1884.

JOSEPH W. PUTNAM, Assoc. Am. Soc. C. E.

DIED MARCH 24TH, 1893.

Joseph W. Putnam was born in 1836. His first important engineering experience was gained in 1862, in the construction of the Connecticut and Passumpsic River Railroad. In 1863 and 1864 he was engaged on the Marietta and Cincinnati Railroad as foreman on tunnel construction, and in 1864-65 in the Military Department of Tennessee, in charge of track laying and bridge construction. From 1865 to 1868 he was employed in similar work on the Nashville and Northwestern Railroad.

In 1869 Mr. Putnam became connected with the New Orleans and Mobile Railroad, and in 1875 was appointed Superintendent of Bridges. While with this road he designed and operated an extensive, complete and successful apparatus for handling and creosoting timber, as well as machinery for pile-driving.

Mr. Putnam was one of a committee appointed by the Society for the Preservation of Timber, and rendered valuable service, through the wide experience gained by him in the investigation of the subject. The Report of the Committee was published in *Transactions*, Volume XIV.

He also read a paper on the same subject before the Society, October 15th, 1879, published in Volume IX of *Transactions*. A paper entitled "Renewal of the Foundation and Transfer of a Lighthouse in Pascagoula Harbor" was published in *Transactions*, Volume X.

He became an Associate of the American Society of Civil Engineers March 3d, 1880.

WILLIAM FREDERIC BEHRENS, Assoc. M. Am. Soc. C. E.

DIED FEBRUARY 6TH, 1894.

William Frederick Behrens was born in Bremen, Germany, July 9th, 1860. His first engineering experience was gained on the Toluca or Mountain Division of the Mexican National Railway, where from June, 1881, to February, 1882, he acted as rodman for the engineering party. From March to September of 1882 he was engaged in the preliminary survey and location of the Mexican International Railroad, and from the latter date to April, 1883, on the Mexican Central Railroad.

In April, 1883, he was appointed Assistant Engineer of this road and remained with it until June, 1885.

After some months' service in 1886 with the Atchison, Topeka and Santa Fé Railroad, Mr. Behrens entered the service of the Colorado Midland Railway as Resident Engineer, having charge of some of the heaviest work of tunneling through the continental divide.

In July, 1888, he was appointed Assistant Engineer of the Atlantic and Pacific Railroad, and was employed in the construction of the Red Rock Cantilever Bridge under S. M. Rowe, M. Am. Soc. C. E., Chief Engineer. He returned to the Atchison, Topeka and Santa Fé Railroad service in 1890, where he remained for a few months and then resigned to engage in the private practice of his profession in Albuquerque, New Mexico.

In August, 1893, he accepted the position of Engineer for the American Colonization Company which was engaged in reclaiming a portion of the Rio Puerco Valley. He was filling this position at the time of his death.

Mr. Behrens was well and favorably known, both as an engineer and a gentleman in the locality where he resided, and had the confidence and esteem of many friends.

He became an Associate Member of the American Society of Civil Engineers June 7th, 1893, having been advanced to that grade from Junior, to which he was elected November 6th, 1889.

HENRY C. JENNINGS, M. Am. Soc. C. E.

DIED MARCH 13TH, 1894.

Henry C. Jennings was born August 2d, 1858, in Boonton, N. J. He was prepared at the Academy in Lawrenceville, N. J.; entered the Rensselaer Polytechnic Institute, Troy, N. Y., in September, 1875, and graduated in 1879. In the same year he went to Wilmington, Del., and was engaged three and a half years with the Edge Moor Iron Company, the principal branch of this company's business being bridge-building. From this place he went to Milwaukee in 1883, and was there engaged as Principal Assistant Engineer in charge of bridges in the office of the Chief Engineer of the Chicago, Milwaukee and St. Paul Railway until 1887, when his health began to fail, and he went to Mexico City, remaining there for a few months. In 1888 he removed to Denver, Colo., where he was engaged as Consulting Engineer until the time of his death from consumption, which occurred March 13th, 1894. He was a man of marked ability as an engineer.

Mr. Henry C. Jennings was elected a Member of the American Society of Civil Engineers April 6th, 1887.

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JOSEPH HILL PADDOCK, M. Am. Soc. C. E.*

DIED APRIL 4TH, 1894.

Joseph Hill Paddock was born at East Liberty (now a part of Pittsburgh), Pa., July 30th, 1856. His father, Rev. William Perry Paddock, was at that time Rector of Calvary Episcopal Church at Pittsburgh (which he founded). From East Liberty the family, in 1872, moved to Philadelphia, where Joseph Paddock attended the public schools. When sixteen years of age he began an apprenticeship as machinist with Mr. J. P. Morris in the Southwark Foundry of Philadelphia, where he remained until the failure of the firm in 1875. These first years of active practical work served, no doubt, to develop and strengthen a natural aptitude for constructive work and a sound judgment regarding practical affairs, which were in later years such marked traits of his character.

Feeling by this time a desire for a more thorough preparation in his chosen field, he entered Lehigh University, and in 1879 graduated with honors, receiving the degree of Mechanical Engineer.

From August to December of this year he was employed by the Cambria Iron Company, when he accepted a position on the Lehigh Valley Railroad at Bethlehem, Pa.

From February to July, 1881, Mr. Paddock was employed as draftsman for the Vulcan Iron Works at Wilkes-Barre, Pa., when he accepted a position as Division Engineer on the Pittsburgh, McKeesport and Youghiogeny Railroad, under J. Wainwright, M. Am. Soc. C. E., Chief Engineer. Here his abilities were appreciated, and he was appointed Resident Engineer in charge of the first eight miles north of Connellsville, which included the Dickerson Run Branch, three miles long, all of which work was completed satisfactorily. During this time he also acted as Assistant Engineer in charge of the construction of an iron highway bridge across the Youghiogeny River, which was quite a difficult piece of work.

In January, 1885, he opened an office in partnership with Mr. A. H. Bowman in Connellsville, as Civil and Mining Engineers, and April 1st, 1886, was engaged by the Mt. Pleasant Water Company in the interests of the H. C. Frick Coke Company to build a reservoir. This work being successfully prosecuted, he was appointed on November 1st, 1886, Chief Engineer for the H. C. Frick Coke Company, which position he held until his death. During this period the coke industry developed at a rapid rate until there were under his supervision 27 coke plants, with their accompanying mines, villages, water supplies and properties, representing in all some \$30 000 000.

* Memoir prepared by Kenneth Allen, M. Am. Soc. C. E.

In addition to this the company undertook in 1889 a topographical survey of the entire Connellsville Coke Region, which covered nearly 170 sq. miles, and was completed in 1892.

Altogether the work under Mr. Paddock's direction was of a varied and often of a difficult character, but by his excellent judgment of men and methods of work, by a conscientious thoroughness in carrying out the projects entrusted to him, and by the enterprise shown in the introduction of improved methods and appliances, the works of the company were placed and maintained on a high standard of excellence.

In good health, at the prime of life and with no personal enemies, his end was as unlooked for as it was cruel.

On the afternoon of April 4th, 1894, while waiting for a train at Davidson station, near Connellsville, with Mr. Hugh Coll, the Master Mechanic of the company, a mob of Slav and Hungarian strikers came up, with whom he quietly remonstrated against their intruding on the company's grounds. Trouble being feared, he had previously been offered a revolver, but had declined, saying that he had no use for it. But now, the men appearing in an ugly mood and menacing them, he and Mr. Coll retreated, but were immediately set upon by the mob. Mr. Coll made his escape, but Mr. Paddock was felled, probably by a stone, and then cruelly beaten and stoned until life was extinct. A bullet wound was found in the back of the head, and although the evidence of witnesses is wanting, it is probable that his sufferings were of brief duration.

Mr. Paddock was married in January, 1883, to Miss Carrie Angel, of Cooperstown, who, with three girls and a boy, survive him. He also leaves six brothers and two sisters. Of the former, three are engineers.

Having spent the best part of his active life in a somewhat isolated region, and having rarely taken time for recuperation away from home, Mr. Paddock was not so widely known in his profession as he would otherwise have been.

In manner he was genial and cheerful, in his dealings considerate, but, when necessary, decided and firm. To his friends and to those in his employ, he was kind and appreciative. By his employers and by the community in which he lived, he was highly esteemed. He was a member, and for several years a vestryman, of Trinity Episcopal Church of New Haven, Pa., and in general was a man of upright aims and broad views.

At the time of his death Mr. Paddock was a member of the Engineers' Society of Western Pennsylvania. He was elected a Member of the American Society of Civil Engineers, October 5th, 1892.

CAROTHE

EARL, G

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LIST OF MEMBERS.

ADDITIONS.

MEMBERS.		Date of Membership.	
CAROTHERS, DANIEL DAWSON.....	Engineer Maintenance of Way Baltimore & Ohio Southwestern Ry., Cin- cinnati, Ohio.....	April 4, 1894	
EARL, GEORGE GOODELL.....	Chief Engineer New Orleans Sewerage Co., 48 Ca- rondelet St., New Or- leans, La....	J. May 7, 1890 Assoc. M. Dec. 2, 1891 M. April 4, 1894	
LEONARD, HENRY READ.....	257 South Fourth St., Philadelphia, Pa.....	April 4, 1894	
PRINCE, GEORGE THOMAS.....	Haddonfield, N. J.....	April 4, 1894	
RICHARDS, JOSEPH THOMAS.....	Engineer Maintenance of Way Pennsylvania R. R., 233 South 4th St., Phila- delphia, Pa.....	April 4, 1894	
ASSOCIATE MEMBERS.			
CREHORE, WILLIAM WILLIAMS.....	39 Cortlandt St., New York City.....	April 4, 1894	
CREUZBAUR, ROBERT WALTER.....	Assistant Engineer N. Y. Finance Dept., 280 Broadway, New York City.....	J. April 2, 1890 Assoc. M. April 4, 1894	
DOEBLER, VALENTINE SHERMAN....	Acting Supervisor Altoona Division, P. R. R., Holli- daysburg, Pa.....	Dec. 6, 1893	
FELTON, BURTON ROGERS.....	City Engineer Marl- borough, Mass.....	April 4, 1894	
HERSEY, GEORGE DANA.....	Maloney Bldg., Youngs- town, O.....	Nov. 1, 1893	
HOVEY, OTIS ELLIS.....	49 Delaware Place, Chicago, Ill.....	April 4, 1894	
KOPS, JULIAN DE BRUYN.....	Assistant City Engineer, Savannah, Ga.....	April 4, 1894	
McKIM, ALEXANDER RICE.....	459 West 24th St., New York City.....	April 4, 1894	

SMITH, PEMBERTON.....	9 German Insurance Bldg., Buffalo, N. Y.	J. March 31, 1891 Assoc. M. April 4, 1894
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JUNIORS.

GREENALCH, WALLACE.....	101 Third St., East Albany, N. Y.....	April 3, 1894
HOPKINS, ALBERT LLOYD.....	Newport News Shipbuilding and Dry Dock Co., Newport News, Va.....	April 3, 1894
WALLBERG, EMIL ANDREW.....	Canadian Bridge and Iron Co., Montreal, Canada..	Oct. 31, 1893
WILCOX, WILLIAM FERDINAND....	General Superintendent Light, Heat and Water Co., Jackson, Miss.....	March 6, 1894
WILKINSON, THOMAS JEFFERSON...	Box 1077, Portland, Ore...	April 3, 1894
WORDEN, BEVERLEY LYON.....	245 Greenbush St., Milwaukee, Wis.....	Dec. 5, 1893

CHANGES AND CORRECTIONS.

MEMBERS.

BATES, ONWARD.....	Engineer and Superintendent Bridges and Buildings, C. M. & St. P. Ry., 1100 Old Colony Bldg., Chicago, Ill.
BOOTH, WILLIAM H.....	125 Bunhill Row, London, E. C., England.
BRINCKERHOFF, H. W.....	45 Broadway, New York City.
CORTHELL, E. L.....	71 Broadway, New York City.
D'INVILLIERS, C. S.....	1411 Sixth Ave., Altoona, Pa.
FAIRLEIGH, JAMES A.....	Brandenburg, Ky.
FEIND, BERNHARD	157 Orchard St., Chicago, Ill.
HAZLEHURST, GEORGE B.....	Catonsville, Md.
MOHUN, EDWARD.....	Union Club, Victoria, B. C.
MORRIS, GOUV.....	Big Stone Gap, Va.
NOBLE, ALFRED.....	302 Belden Ave., Chicago, Ill.
OGDEN, H. N.....	Woodford, Me.
PAINE, CHARLES.....	32 Park Place, New York City.
ROBINSON, JOHN J.....	Care The Cachavi Co., 40 Wall St., New York City.
ROWE, R. D.....	168 Seventy-fourth St., Chicago, Ill.
ROWE, S. M.....	168 Seventy-fourth St., Chicago, Ill.
RUTHERFURD, F. M.....	46 East Sixty-fourth St., New York City.
SHANKLAND, E. C.....	D. H. Burnham & Co., The Rookery, Chicago, Ill.
SMITH, ISAAC A.....	2814 Gamble St., St. Louis, Mo.
SMITH, WILLIAM SOOY.....	100 Washington St., Chicago, Ill.
STANTON, ROBERT B.....	443 Bradbury Bldg., Los Angeles, Cal.

WAITE, J.
WHITFOR
WROTON

BAIER, J.
COCKRO

GAHAGAN
HOWARD

HYDE, A.
MILLER

RIGGS,

WATSON

KARNEY
TRAUT

BELL,
HALLI
HORTO
HOWE,
MOORE
STANF

JENN

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93

WAITE, JOHN C.....32 Park Place, New York City.
 WHITFORD, O. F.....409 Pearl St., Buffalo, N. Y.
 WROTNOWSKI, A. F.....Godchaux Bldg., New Orleans, La.

ASSOCIATE MEMBERS.

BAIER, JULIUS.....	Union Depot, Room 9, St. Louis, Mo.
COCKROFT, C. A.....	Division Engineer's Office, State Hall, Albany, N. Y.
GAHAGAN, W. H.....	1241 Michigan Ave., Chicago, Ill.
HOWARD, C. P.....	Chief Engineer's Office Ohio Southern Ry., Springfield, O.
HYDE, A. LINCOLN.....	721 Hickox Bldg., Cleveland, O.
MILLER, S. B.....	Care New Rochelle Water Co., New Rochelle, N. Y.
RIGGS, H. E.....	Chief Engineer T. A. A. & N. M. Ry., Toledo, O.
WATSON, WALTER.....	67 North Elm St., Northampton, Mass.

ASSOCIATES.

KARNER, W. J.....71 Broadway, New York City.
 TRAUTWINE, JOHN C., Jr419 Locust St., Philadelphia, Pa.

JUNIORS.

BELL, G. J.	Care A. T. & S. F. Ry., Orrich, Mo.
HALLIBURTON, W.	Brownsville, Tenn.
HORTON, SANDFORD.	19 West 131st St., New York City.
HOWE, H. J.	942 Beacon St., Brookline, Mass.
MOORE, E. C.	1337 Pacific St., Brooklyn, N. Y.
STANFORD, H. R.	Care Pratt and Letchworth, Buffalo, N. Y.

DEATHS.

JENNINGS, HENRY CLAY.....Elected Member April 6th, 1887; died
March 13th, 1894.

PADDOCK, JOSEPH HILL.....Elected Member Oct. 5th, 1892; died April
4th, 1894.

ADDITIONS TO
LIBRARY AND MUSEUM.

From Clifford Buxton, Toledo, O.: Geological Survey of Ohio, Paleontology, Vol. I-II; Economic Geology, Vols. V, VI; Maps, 1873; Geology, Vols. I-IV.	From Canadian Society of Civil Engineers, Montreal, Can.: List of Members and Report of Annual Meeting, 1894.
From Canadian Institute, Toronto, Can.: Transactions. Vol. IV, Part I. Seventh Annual Report, Session 1893-94.	From Connecticut State Board of Health: Sixteenth Annual Report for the year ending June 30th, 1893.

- From J. J. R. Croes, New York:
The Sewerage of the Village of Geneva,
N. Y.
- From C. Gilman Carrier, M. D., New York:
American Practical Hygiene of To-Day.
- From H. Engels, Dresden, Germany:
Technische Hochschulen in den Vereinigten
Staaten Nordamerikas.
- From Engineering Association of New South
Wales:
Australian Timbers.
Administration Report, Public Works
Department, New South Wales, for
1892-93.
- From John R. Freeman, Boston, Mass.:
A Memoir of James Bicheno Francis.
- From E. A. Fuertes, Cornell University, N. Y.:
Sanitary Improvements for the City and
Port of Santos, Brazil.
- From Lieut. J. H. Glennon, U. S. N., Annapolis,
Md.:
Velocity of Combustion of an Explosive
under Variable Pressure.
- From Edwin A. Hall, Springfield, Ill.:
Sixteenth to Twenty-third Annual Report
of the Peoria Board of Trade,
1885-1892.
Annual Report of the R. R. Commissioner
of Iowa, 1893
Annual Reports of the R. R. Commissioner
of Illinois, 1891-93.
Proceedings Eighteenth Meeting of the
Am. Soc. R. R. Superintendents.
- From Wm. E. Worthen, New York:
An Account of some Experiments with
Portland Cement Concrete, combined
with Iron, as a Building Material.
- From Institution of Civil Engineers, London:
Minutes of Proceedings. Vol. CXV.
List of Members, April 2d, 1894.
- From Thos. C. Keefer, Ottawa, Can.:
The Canals of Canada.
- From L'Association Amicale des Anciens
Elèves de l'Ecole Centrale des Arts et Manufactures,
Paris, France.
Annuaire, 1892-1893.
- From Lt.-Col. Wm. Ludlow, London, Eng.:
The Construction of a Breakwater at the
Free Port of Copenhagen.
- From Daniel W. Mead, Rockford, Ill.:
The Geology of Wisconsin Water Supplies.
- From Patent Office, London, Eng.:
Abridgments of Specifications. Divisions
V and VI.
- From Public Library, Boston, Mass.:
Bulletin, April, 1894.
- From Public Works Department, Madras,
India:
Administration Report of the Public
Works Department, Irrigation Branch
in the Madras Presidency, for the year
1892-93
- From Andrew Rosewater, Omaha, Neb.:
Report of the City Engineer of Omaha,
Neb., for 1893.
- From Collingwood Schreiber, Ottawa, Can.:
Annual Report of the Department of
Railways and Canals for the fiscal year
from July 1st, 1892, to June 30th, 1893.
- From Hamilton Smith, London, Eng.:
Superintendent's Report of the Alaska-
Mexican Gold Mining Company.
- From Smithsonian Institute, Washington,
D. C.:
Bulletin of the U. S. National Museum,
No. 43 (A Monograph of the Bats of
North America).
Annual Report of the Board of Regents
to July, 1892.
- From J. B. Tyrrell, Ottawa, Can.:
Report on North-Western Manitoba.
- From U. S. Department of State:
General Index to Consular Reports.
- From U. S. Geological Survey:
Twenty-six map sheets, U. S. Geological
Survey.
- From U. S. Navy Department:
Pilot Chart of the North Atlantic Ocean,
April, 1894.
- From U. S. Navy Department, Nautical Almanac
Office:
Astronomical Papers of the American
Ephemeris. Vol. V. Parts I and II.
2 copies.
- From U. S. Treasury Department, Bureau of
Statistics:
Wool and Manufactures of Wool.
- From U. S. War Department, Chief of Engineers:
Annual Report of the Mississippi River
Commission for the fiscal year ending
June 30th, 1893.
Annual Report of the Chief of Engineers,
Parts 1 to 6, 1893.
- From University of the State of New York:
One Hundred and sixth Annual Report
of the Regents.
Seventy-fifth Annual Report of the New
York State Library for the year ending
September 30th, 1893.
- From H. Vetillart, Havre, France:
Carte des Voies navigables des États Unis
de l'Amérique du Nord, 1890.
- From G. A. Wetherbee, Malden, Mass.:
Reports of the Board of Street Commissioners
and City Engineer for the year
ending December 31st, 1893.
- From E. A. Ziffer, Austria:
Mittheilungen des Vereines für die Förderung
des Local und Strassenbahnwesens. Parts 1, 2, 3, 1894.

American Society of Civil Engineers.

PROCEEDINGS.

Vol. XX.—May, 1894.

MINUTES OF MEETINGS.

(Abstract of such as may be of general interest to Members.)

OF THE SOCIETY.

MAY 2D, 1894.—The Society met at 20 o'clock, Vice-President Macdonald in the chair; F. Collingwood, Secretary, and present, also, 70 Members and 10 visitors. Ballots were canvassed, and the following candidates were declared elected: As Members—Thomas Wolfe Morgan, Oakland, Cal.; Nathaniel Roberts (elected Assoc. M. November 4th, 1891), Jersey City, N. J.; John Warren Sackett, St. Augustine, Fla. As Associate Members—Abert Johnstone Campbell, Mexico, Mex.; James Harvey Edwards (elected Junior May 31st, 1892), East Berlin, Conn.; John Franklin Jackson, Milwaukee, Wis.; Thomas Francis Lawlor (elected Junior June 5th, 1889), Poughkeepsie, N. Y.; Reginald McKean, St. Louis, Mo.; Arthur Smith Tuttle (elected Junior March 2d, 1887), Brooklyn, N. Y.; Guy Bennett Waite, New York City.

Announcement was made of the election by the Board of Direction of one Associate and three Juniors.

The Secretary presented a communication from the Society of Engineers, of London, and one from the Board of Direction of the German Architects and Engineers' Association of Berlin, conveying thanks to this Society and to the allied societies of the United States and Canada for the courtesy and hospitality shown to their members during the Columbian Exposition.

A paper by Montgomery Meigs, M. Am. Soc. C. E., on the "Use of Canvas in Water-Tight Bulkheads," was read by the Secretary, and discussed by Messrs. A. McC. Parker and Macdonald.

A paper by Addison M. Scott, M. Am. Soc. C. E., on "General Notes on the Great Kanawha Improvement, Tripping Bars and Improved Hurters on Chanoine Wicket Dams," etc., was presented. A written discussion on this paper by William P. Craighill, President Am. Soc. C. E., was also read.

MAY 16TH, 1894.—The Society met at 20 o'clock, Director Bernard R. Green in the chair; F. Collingwood, Secretary; and present, also, 54 members and 4 visitors.

A paper on "The Reconstruction of a Portion of the Substructure of the Jacksonville Bridge," by Walter A. Gahagan, Assoc. M. Am. Soc. C. E., was read by the Secretary, and was discussed by Messrs. Brendlinger and Easby.

A paper by William Barclay Parsons, M. Am. Soc. C. E., on "The Failure of a Masonry Pier and a Rock Foundation," was read by the author, and discussed by Messrs. Brendlinger, Owen and the author.

OF THE BOARD OF DIRECTION.

MAY 1ST, 1894.—The Board met at 20 o'clock, 10 members present.

Charles L. Strobel, M. Am. Soc. C. E., was elected Director of the Society to fill the vacancy caused by the death of Mr. Abraham Gottlieb.

It was decided to continue to keep the Society House open for the convenience of members on every Wednesday evening.

Applications were considered and other routine business transacted.

The following applicants were elected: As Associate—John Shaw Walker. As Juniors—Washington Righter Craig, George Fetter Stickney, and Mackey James Thompson.

MEMOIR OF DECEASED MEMBER.

SUMNER HOMER BODFISH, M. Am. Soc. C. E.*

DIED MAY 17TH, 1894.

Sumner Homer Bodfish was born August 16th, 1844, at Chicopee, Mass. His father was a hydrographic engineer of more than local repute, and came of old New England stock. His early life was spent in the public schools of New Haven, Conn., where he showed more than ordinary aptitude in his studies.

Memoir prepared by H. M. Wilson, M. Am. Soc. C. E.

In the Spring of 1863, when yet less than nineteen years of age, young Bodfish enlisted in the Forty-sixth Massachusetts Infantry, in which he served nine months. He re-enlisted for the remainder of the war in the Second Massachusetts Heavy Artillery, and saw active service in the battle of Kingston, N. C., and in the vicinity of New-Berne. After his regiment returned to Massachusetts, he saw further service in the Boston draft riots.

At this time President Lincoln gave Mr. Bodfish an appointment to West Point, from which institute he graduated in the class of 1868. He was shortly after ordered to Fort Tyler, Tex., and commissioned as a Second Lieutenant in the Sixth Cavalry. As a result of his high standing on graduation and the excellence of his conduct as an officer, he was almost immediately made Regimental Adjutant, though a junior officer. Later on, he was made Provost Marshal.

Mr. Bodfish's civil engineering career commenced in January, 1871, when he resigned from the army to engage in hydraulic engineering work with his father, at Langley, Ga., in the construction of a dam and mill race, and other works, for the Langley Cotton Mills. In the spring of 1872 he went to Washington, D. C., where he was shortly afterward appointed First Assistant Engineer of the Board of Public Works. He remained in this office for some time, and had charge of extensive underground works. In the spring of 1878 he took charge of a large dredging contract on the Patapsco River, at Baltimore.

In the fall of 1878 Mr. Bodfish was appointed a topographer in the Powell Survey, and from then until 1890 he remained continuously in the employ of that and of the U. S. Geological Survey as Topographer and later as Irrigation Engineer. His first work for the Powell Survey, in 1878, was measuring angles, in a scheme of triangulation planned by G. K. Gilbert, which connected the expansion between the Gunnison and Kanab bases. During the field seasons of 1878-79 and 1880 he mapped the country in the vicinity of the Grand Cañon of the Colorado.

In the summer of 1880, upon the organization of the U. S. Geological Survey, Mr. Bodfish was appointed a topographer by that Survey, and spent the seasons of 1880-81 in topographic work in southern Utah, making general maps at a scale of 4 miles to 1 in., with contours distant 250 ft. apart, vertically. In 1882 he was engaged on detailed topographic work in the quicksilver mining region of California. The following six seasons were spent, until the fall of 1888, on map work at a scale of 1 mile to 1 in., and 20-ft. contours, in the neighborhood of Washington and in various portions of Massachusetts.

Shortly after the creation of the Irrigation Survey, Mr. Bodfish was appointed Irrigation Engineer in the spring of 1889, and spent that season and the early portion of 1890 until the Irrigation Survey was discontinued by Congress, in charge of the Colorado Division. In the

course of this work he made general surveys for the discovery of reservoir sites and to ascertain their capacities, and the modes by which water could be conducted from them to the surrounding arid lands. He also made detailed surveys of the 11 reservoir sites in the upper valley of the Arkansas, these surveys being at very large scales, from 200 to 400 ft. to 1 in., and 2-ft. and 4-ft. contours. The winter of 1889 was occupied in computing the cost of the dams and the capacities of the reservoirs, and in making detailed plans for their construction.

Upon the discontinuance of the Irrigation Survey Mr. Bodfish returned to private engineering practice, being occupied in the fall of 1890 in mapping for the War Department the fortifications on the Potomac River. After the completion of that work he was engaged in numerous private engineering works and was largely interested in several projected electric railways in and about Baltimore and Washington. His last work was a careful survey of the Great Falls of the Potomac for B. F. Butler's Boston company, and a careful determination of the quantity and value of the water-power which could be derived from these falls. In October, 1893, ill health compelled him to leave this work, after which date he remained an invalid until the day of his death, which occurred Thursday, May 17th, 1894. He was buried on the following Saturday at Arlington, the funeral being conducted by the Loyal Legion, of which he was an honored member. He leaves a wife in fairly comfortable circumstances.

Mr. Bodfish was always a careful, painstaking and conscientious worker, who was at his best in designing or conducting careful surveys or engineering works which called for care and thoroughness in the execution of their details.

LIST OF MEMBERS.

ADDITIONS.

MEMBERS.		Date of Membership.	
MOFFET, JAMES DAVID.....	Assistant Engineer, Main. of Way, Pulaski and North Carolina Divs., N. and W. R.R., Radford, Va.	Assoc. M. Nov. 4, 1891 M. Feb. 7, 1894	
SACKETT, JOHN WARREN.....	U. S. Engineer Office, St. Augustine, Fla....	May 2, 1894	
SPRING, FRANCIS JOSEPH EDWARD....	Consulting Engineer to the Government of India, Shillong, India...	Jan. 3, 1894	

MAY PROCEEDINGS.

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ASSOCIATE MEMBERS.

BARNESLEY, GEORGE THOMAS.....	Olney, Md...	J.	May 31, 1892
CAMPBELL, ABERT JOHNSTONE	Box 409, New York City.	Assoc. M.	March 7, 1894
HITCHCOCK, FREDERICK COLLAMORE..	1027 Grand Ave., Toledo,		May 2, 1894
	Ohio.....		March 7, 1894
JACKSON, JOHN FRANKLIN.....	884 Booth St., Milwau-		
	kee, Wis.....		May 2, 1894
LAWLOR, THOMAS FRANCIS.....	Chief Engin-		
	eer P. and		
	W. F. St.	J.	June 5, 1889
	Railway,	Assoc. M.	May 2, 1894
	Pough-		
	keepsie, N.		
	Y.....		
MATHEWSON, ISAAC.....	Grafton, Ill.....		March 7, 1894
TUTTLE, ARTHUR SMITH.....	Assistant En-		
	gineer,	J.	March 2, 1887
	Dept. of	Assoc. M.	May 2, 1894
	City Works,		
	Municipal		
	Bldg.....		
WAITE, GUY BENNETT.....	220 Fourth Ave., New		
	York City.....		May 2, 1894

ASSOCIATES.

JOHNSTON, JOHN PARRY.....	29 Cortlandt St., New		
	York City.....		April 3, 1894
WALKER, JOHN SHAW.....	Apia, Samoa.....		May 1, 1894

JUNIORS.

CRAIG, WASHINGTON RIGHTER.....	N. and W. R. R., Vivian,		
	W. Va.....		May 1, 1894
STICKNEY, GEORGE FETTER.....	U. S. Engineer office,		
	Frankfort, Ky.....		May 1, 1894
THOMPSON, MACKEY JAMES.....	The "Branch," Thomas-		
	ton, Conn.....		May 1, 1894

CHANGES AND CORRECTIONS.

MEMBERS.

BASSETT, CARROLL PH.....	Summit, N. J.
BROWN, THOMAS E., JR.....	38 Park Row, Room 61, New York City.
BRYSON, ANDREW.....	29 Broadway, New York City.
COWLES, W. L.....	292 Park Ave., Chicago, Ill.
FOLLETT, W. W.....	233 E. Maple St., Denver, Colo.
FOOTE, A. D.....	Boise City, Idaho.
FULTON, JOHN A.....	La Grange, Cook Co., Ill.

GOULD, E. SHERMAN.....	(Care Runkle, Smith & Co.), 15 Wall St., New York City.
GOULD, WILLIAM T.....	1014 Clark St., Paducah, Ky.
GRAHAM, CHARLES H.....	158 Center Ave., New Rochelle, N. Y.
GRIMM, C. R.....	3149 North 15th St., Philadelphia, Pa.
HATCH, FRED. T.....	Superintendent Vandalia Lines, Logans- port, Ind.
JUST, GEORGE A.....	128 West 42d St., New York City.
LEWINSON, M.....	128 West 42d St., New York City.
LONG, THOMAS J.....	Union Bridge Co., 1 Broadway, New York City.
MITCHELL, HENRY.....	Nantucket, Mass.
NOURSE, E. G.....	637 Rialto Building, Chicago, Ill.
OLNEY, L. F.....	Mahwah, N. J.
PACKARD, R. G.....	31 Pine St., New York City.
PROUT, HENRY G.....	32 Park Place, New York City.
ROTHWELL, R. P.....	253 Broadway, New York City.
SCHAUB, J. W.....	1614 S. 18th St., St. Louis, Mo.
TOMLINSON, A. T.....	Huntington, N. Y.
TOMPKINS, J. A. B.....	Wauwatosa, Wis.
WAGNER, SAMUEL TOBIAS.....	Wayne, Pa.

ASSOCIATE MEMBERS.

CUMMINGS, R. A.....	(Care Engineers' Club), Girard St., Phila- delphia, Pa.
CUSHING, W. C.....	Engineer Main. of Way, Pittsburg Div. P. C. C. & St. L. Ry., 2 Carson St., Pittsburg, Pa.
ERLANDSEN, O.....	169 Main St., Woonsocket, R. I.
GEMMELL, R. C.....	255 Second East St., Salt Lake City, Utah.
HENRY, P. W.....	273 Madison Ave., New York City.
PENNYPACKER, L. P.....	Assistant Engineer Guatemala Northern Ry., Puerto Barrios, Guatemala.
SNOW, CHARLES H.....	476 West 144th St., New York City.

ASSOCIATES.

GIBSON, WILLIAM, JR.....	414 Classon Ave., Brooklyn, N. Y.
HARDWICKE, A. H. G.....	Niagara Falls, N. Y.
POMEROY, L. R.....	256 Broadway, New York City.
TOMKINS, CALVIN.....	32 Liberty St., New York City.

JUNIORS.

ABBOTT, E. L.....	114 Dearborn St., Room 312, Chicago, Ill.
FISH, J. C. L.....	Florence, Erie Co., Ohio.
HEWITT, CONRAD.....	128 West 42d St., New York City.
HILDRETH, R. W.....	50 Broadway, New York City.
HOYT, J. T. N.....	447 Lexington Ave., New York City.
JEWETT, C. H.....	83 Broad St., Newark, N. J.
LAWTON, F. B.....	128 West 42d St., New York City.

MASON, GEORGE C.....1423 Lexington Ave., New York City.
 PARKER, CHARLES F.....38 Park Row, Room 61, New York City.
 ROGERS, W. A.....215 Division St., Elgin, Ill.
 YORK, H. W.....Chief Engineer United Electric Light and
 Power Co., 108 Fulton St., New York
 City.

FELLOW.

FLINT, CHARLES RBrooks' Locomotive Works, Dunkirk, N.Y.

DECEASED.

BODFISH, SUMNER HOMER.....Elected Member October 2d, 1889; died
 May 17th, 1894.
 MURDOCH, GILBERT.....Elected Member September 7th, 1881;
 died May 28th, 1894.

ADDITIONS TO

LIBRARY AND MUSEUM.

- From American Institute of Mining Engineers:
 A Convenient Still for the Laboratory.
 Benjamin Huntsman, of Sheffield, the
 Inventor of Crucible Steel.
 Coal Sections Developed by Recent Operations
 in Wise County, Virginia.
 Correlations in the Coal Rocks West of
 Pocahontas, Flat Top, Virginia.
 Discussions: On Genesis of Ore Deposits;
 on Growth of American Mining
 Schools; on Limitations of the Gold
 Stamp Mill; on the Detection and
 Measurement of the Fire Damp in
 Mines and the Hydrogen Oil Safety
 Lamp; on the Origin of the Gold Bearing
 Quartz of the Bendigo Reefs, Australia;
 on Geological Distribution of
 the Useful Metals in the United States.
 Gold Milling at the North Star Mine,
 Grass Valley, Nevada County, Cal.
 Iron Ores of East Texas.
 Proceedings of the Sixth-sixth Meeting,
 Virginia Beach, Va., February, 1894.
 The Allotropism of Gold.
 The Bauxites: A Study of a new Mineral-
 ogical Family.
 The Geological Relations of the Southern
 Appalachian Bauxite Deposits.
 The Heat Treatment of Steel.
 The Refining of Gold Sulphides produced
 by the Precipitation of Gold from
 Chlorine or Bromine Solution with
 Sulphurous Acid and Hydrogen Sul-
 phide.
 The Silver Mines of Lake Valley, New
 Mexico.
 The Torsional Theory of Joints.
 The Zinc Ore Deposits of Southwestern
 New Mexico.
- From Board of Railroad Commissioners,
 Boston, Mass.:
 Twenty-fifth Annual Report, January,
 1894.
- From Committee of Locomotive and Car-
 riage Superintendents for India, Simla,
 India:
 Proceedings, Fourth Meeting, Lahore,
 December, 1892, Vol. IV.
- From Cornell University, Ithaca, N. Y.:
 Library Bulletin, Vol. III, No. 6.
- From Engineering Society of School of
 Mines, Columbia College, N. Y.
 Year Book, 1893-94.
- From India Office, London, Eng.:
 Administration Report on the Railways
 in India for 1892-93.
- From Lake Shore and Michigan Southern
 Railway Company:
 Twenty-fourth Annual Report, for 1893.
- From Sidney F. Lewis, New Orleans, La.:
 Report of the Board of State Engineers
 of the State of Louisiana from April
 20th, 1892, to April 20th, 1894.
- From L. Luiggi, Leghorn, Italy:
 Esperimente sulle Calci, Sabbie, Pozzo-
 lane, Cementi, Malte e Murature
 eseguiti durante i Lavori del Porto di
 Genova.
- From James McShane, Mayor of Montreal,
 Can.:
 Municipal Reports for the year 1892.
- From Minister of Public Works, Paris,
 France:
 Ports Maritimes de la France. Two vols.
 Atlas Ports Maritimes de la France.
 Nineteen plates.

- From Robert Moore, St. Louis, Mo.:
Annual Address as Retiring President of the Engineers' Club of St. Louis.
- From N. Y. Meteorological Observatory:
Annual Tables for the Year 1893.
- From North of England Institute of Mining and Mechanical Engineers, Newcastle, Eng.:
An Account of the Strata of Northumberland and Durham, as proved by Borings and Sinkings.
- From Patent Office, London:
Abridgments of Specifications for Patents relating to Electricity and Magnetism.
- From Pennsylvania Railroad Company, Phila., Pa.:
Forty-seventh Annual Report for the year 1893 of the Board of Directors of the Pennsylvania Railroad Company.
- From John P. Prichard, Medford, Mass.:
Annual Report of the Street Commissioner of the City of Medford, for the year ending January 31, 1894.
- From Portuguese Society of Civil Engineers, Lisbon, Portugal:
Revista de Obras Publicas e Minas. Vol. 1 to 22, inclusive.
Eighteen Maps of Portuguese possessions.
Communicacoes da Seccao dos Trabalhos Geologicos de Portugal, 2 vols.
Relatorio da Comissao desempenhada em Hespanha no Anno de 1878.
Contributions à la Flore Fossile du Portugal.
Description de la Faune Jurassique du Portugal. 2 vols.
Etude Stratigraphique et Paléontologique du Portugal.
Descripcao do Solo Quaternario das Bacias Hydrographicas do Tejo e Sado.
Recueil d'Etudes Paléontologiques sur la Faune Crétacique du Portugal. 2 vols.
Description de la Faune Jurassique du Portugal.
Fauna Silurica de Portugal.
Etude Géologique du Tunnel du Rocío.
Estudos sobre os Bilobites e outros Fosseis das Quartzites da Base do Systema Silurico de Portugal. 2 vols.
Contributions à la Connaissance Géologique des Sources Minéro-Thermales des Aires Mésozoïques du Portugal.
- Albums of Photographs:
Escola Practica de Engenharia, Porto de Leixões.
Caminho de Ferro da Beira Alta.
Caminho de Ferro do Douro.
Caminho de Ferro do Minho.
Ponte D. Luiz Porto.
Ponte de Entre-os-Rios.
Ponte de D. Maria Pia.
Porto de Lisboa.
Mémoire sur l'Egout et l'Assainissement de la Ville de Coimbra.
Nouvelle Méthode pour le Calcul des Profils en Travers des Routes et des Chemins de Fer.
A Brief Account of the Building of Leixões Harbour.
O Porto de Macau, Ante-Projecto Para o seu Melhoramento.
Common Roads, Railways and River Communications in Portugal.
- Notice sur les Travaux d'Amélioration du Port de Lisbonne.
Congrès International d'Anthropologie et d'Archeologie Préhistoriques. Compte Rendu de la Neuvième Session à Lisbonne, 1889.
Relatorio acerca da Quarta Sessão do Congresso Geologico Internacional. Setembro, 1888.
Relatorio acerca da Decima Sessão do Congresso Internacional de Anthropologia e Archeologia Prehistoricos.
Matériaux pour l'Etude Stratigraphique et Paléontologique de la Province d'Angola.
Flora Fossil de Portugal.
Recueil de Monographies Stratigraphiques sur le Système Crétacique du Portugal.
Noticia de Algumas estações e Monumentos prehistoricos em Portugal, 1878, 1880. 2 vols.
Relatorio e outros Documentos relativos a Comissao Scientifica desempenhada em diferentes Cidades da Italia, Alemanha e França.
Estudo de Depositos Superfísicos da Bacia do Douro.
- From Public Works Department, Adelaide, Australia:
Report for the year ending June 30th, 1893.
- From Railway Commissioners of New South Wales, Sydney, N. S. W.:
Annual Report for the year ending 30th June, 1893.
- From Addison C. Rand, N. Y.:
The Uses of Compressed Air.
- From Sanitary District of Chicago:
Proceedings of Board of Trustees, April 25th, May 2d and 9th.
- From J. Hamilton Smith, London, Eng.:
Report of the Superintendent of El Callao Gold Mining Company for 1893.
- From George H. Thomson, N. Y.:
Specifications for Structural Steel for Modern Railroad Bridges.
- From U. S. Department of Agriculture:
Report of the Microscopist for 1892.
Food Products. Parts I, II, III.
- From U. S. Department of Agriculture, Weather Bureau:
Circular of Information (Protection from Lightning).
- From U. S. Geological Survey:
Twelfth Annual Report of the U. S. Geological Survey, 1890-91. Part 1, Geology. Part 2, Irrigation.
- From U. S. War Department, Chief of Engineers:
Report of Examination of the Missouri River from Three Forks to Canyon Ferry, Mont.
Report on the Nicaragua Canal in its Military Aspects.
Eight Reports on the Improvement of certain Rivers and Harbors.
- From Edward N. Vallandigham:
Photograph of Triangulation to Establish the line between Delaware and Pennsylvania.
- From Lebbeus B. Ward, Jersey City, N. J.:
Proposed Act for Furnishing State Water Supply to the Municipalities of New Jersey.

American Society of Civil Engineers.

PROCEEDINGS.

Vol. XX.—June, 1894.

MINUTES OF MEETINGS.

(Abstract of such as may be of general interest to Members.)

OF THE SOCIETY.

JUNE 6TH, 1894.—The Society met at 20 o'clock. Vice-President Charles Macdonald in the chair; F. Collingwood, Secretary.

The ballot for members was canvassed, and the following declared elected: As Members, Harry Huse Campbell, Steelton, Pa.; Walter Frank Carr, Roanoke, Va.; Adelbert Eugene Cumming, Helena, Mont.; John Vipond Davies, New York City; Alexis Henry French, Brookline, Mass.; Harvey Mosher Geer, Fargo, N. D.; Arthur Stanley Hobby, Cincinnati, O.; Sergey Damianovitch Kareischa, St. Petersburg, Russia; Arthur Towne Thomas, Superior, Wis. As Associate Member, William Stone Johnson, Brooklyn, N. Y.

Announcement was made of the election by the Board of Direction of two Associates and two Juniors.

The following deaths were announced:

Sumner Homer Bodfish, elected Member October 2d, 1889; died May 17th, 1894.

Gilbert Murdoch, elected Member September 7th, 1881; died May 28th, 1894.

George Howland, Jr., elected Fellow June 6th, 1870; died July 18th, 1892.

A paper was read by Eugene Lentilhon, Jun. Am. Soc. C. E., on "A Concrete Sewer on Piles." The paper was illustrated by the stereopticon, and was discussed by Messrs. Cole, Tribus, Collingwood, C. W. Hunt, North, R. L. Harris, Stuart, Macdonald, Kenly, Duane and Gosling.

ANNUAL CONVENTION OF THE SOCIETY HELD AT NIAGARA
FALLS, N. Y., JUNE 20TH-25TH, 1894.

FIRST SESSION, WEDNESDAY, JUNE 20TH, MORNING.—William P. Craighill, President Am. Soc. C. E., in the chair.

The CHAIR.—The Society will come to order.

The Constitution provides that a convention of the Society for the reading and discussion of professional papers and for social intercourse shall be held annually at such time and place as the Society may determine. This is the 26th Annual Convention of the Society, which, by order of the Board of Direction, meets to-day at this place. I congratulate the Society on the full attendance that we are likely to have, and on the excellent quality of that attendance, and I am very much pleased to see that quite a number of ladies are going to be with us on this occasion, as that always adds grace and pleasure to the meetings of the Society.

We have been very fortunate this year, not only in the place of meeting, but also in having a most efficient and active Local Committee, under the charge of Mr. Brackenridge, one of our members resident here. We have also been peculiarly fortunate in the new arrangement by which a committee of the Board of Direction has been in charge of the general arrangements of the meeting. These it has attended to in a most excellent manner, and I think the Society should understand that the members are greatly indebted to this Committee, and especially to Mr. Crowell, the chairman. The Secretary and his assistants have been, of course, energetic in the performance of their duties also.

If there are any Past Presidents present I will ask them to come forward and take seats on the platform.

(Gen. Greene and Messrs. Worthen, Keefer, Cohen, Whittemore and Metcalf took seats on the platform.)

The chairman of the Local Committee, Mr. Brackenridge, is present and has some announcements to make.

Mr. Brackenridge made a number of announcements.

The Secretary announced as to Trunk Line certificates, the order of meetings, papers to be read, etc.; also as to the Congress of Internal Navigation.

A paper on "The Quality of Water Supplies," by John W. Hill, M. Am. Soc. C. E., was presented by the author, and discussed by Messrs. Desmond FitzGerald, William E. Worthen and James Francis.

A paper on "Chautauqua, N. Y., Sewage Disposal Works," by William B. Landreth, M. Am. Soc. C. E., was presented by the Secretary.

A paper on "Sandrock Sewers in St. Paul, Minn.," by George L.

Wilson, M. Am. Soc. C. E., was presented by the author and discussed by Messrs. Albert F. Noyes, FitzGerald, Hilgard, Fanning, Whittemore and Wilson.

A paper by John R. Freeman, M. Am. Soc. C. E., on "Hoisting Apparatus of the Canal Head-Gates at Sewall's Falls, N. H.," was presented in abstract by the Secretary, and discussed by Messrs. Herschel, FitzGerald, Fanning, Hilgard, Worthen, Frizell, Jaques, Keefer and O'Rourke.

SECOND SESSION, WEDNESDAY AFTERNOON.—A paper on "Notes on Wire Rope Tramways," by A. C. Savage, M. Am. Soc. C. E., was presented in abstract by the Secretary.

A paper on "Steam and Electric Cable-Ways for Logging and Canal Boat Towing," by Richard Lamb, Assoc. M. Am. Soc. C. E., was presented by the author, and discussion on these two papers followed by Messrs. Miller and Lamb.

An abstract of the paper "The Cippoletti Trapezoidal Weir," by A. D. Flinn and C. W. D. Dyer, was read by Mr. Herschel.

A paper on "The Niagara Gorge," by L. L. Buck, M. Am. Soc. C. E., was presented by the author, and discussed by Messrs. FitzGerald, Garrison, Miller, Fletcher, Lamb, Frizell, Fanning, Hilgard and Buck.

A paper "On Form of Railway Excavations and Embankments," by Past President D. J. Whittemore, was presented by the author, and discussed by Messrs. Crowell, Washburn, Hilgard, Cohen, FitzGerald, Reece, Knap, Noyes, and Whittemore.

A paper on "Brafford's Ridge Tunnel," by Chas. W. Staniford, M. Am. Soc. C. E., was read in abstract by the Secretary.

An abstract of the paper on the "Tequiquiac Tunnel, Valley of Mexico," by Abert Johnstone Campbell and Frederick William Abbot, Assoc. Ms. Am. Soc. C. E., was presented.

The Secretary stated that a written discussion on these papers would be printed with the papers.

An abstract of the paper on "Friction Rollers," by C. L. Crandall, M. Am. Soc. C. E., was presented by the Secretary.

THIRD SESSION, WEDNESDAY EVENING.—The Annual Address was delivered by the President, Col. Wm. P. Craighill, on the subject of the Coast Defences of the United States, after which a description of the works executed by the Cataract Construction Company connected with the development of power at Niagara, illustrated by the stereopticon, was given by Dr. Coleman Sellers and Mr. W. A. Brackenridge.

FOURTH SESSION, THURSDAY, JUNE 21ST, MORNING.—William P. Craighill, President Am. Soc. C. E., in the chair.

A paper on "The Pulp Mill of the Cliff Paper Company, at Niagara Falls," by W. C. Johnson, M. Am. Soc. C. E., was presented by the author, and discussed by Messrs. Herschel, Fanning, Frizell and Johnson.

A paper on "Railroad Signaling," by John P. O'Donnell, M. Am. Soc. C. E., was presented by the author, and discussed by Messrs. FitzGerald, Crowell, Tratman, Prout, Wallace, Seaman, Ramsey and O'Donnell.

The Convention then adjourned, and the first session of the Business Meeting was convened.

(See Business Meeting, First Session.)

On Thursday afternoon an excursion over the Niagara Falls Park and River Railway was taken.

On Friday an excursion to the works of the Niagara Falls Power Company, the Niagara Development Company, the Niagara Junction Railway, the Niagara Falls Hydraulic Power and Manufacturing Company, with luncheon at Echota Hall by invitation of the Cataract Construction Company, was taken.

On Saturday morning the second session of the Business Meeting was held (see Business Meeting, Second Session).

FIFTH SESSION, SATURDAY, JUNE 23D, AFTERNOON.—Third Session of Business Meeting (see Business Meeting, Third Session). Convention resumed. Vice-President Macdonald in the chair.

The discussion on the paper on "Railroad Signaling" was continued by Messrs. Crowell and O'Donnell.

A paper on "The Load Line in Telephone Exchanges," by A. V. Abbott, Jun. Am. Soc. C. E., was presented by the author.

A paper on "Removal of Rock to a Grade of 35 Ft. below Mean Low Water," by J. A. Bense, M. Am. Soc. C. E., was presented by the author, and discussed by Messrs. O'Rourke, T. Guilford Smith, FitzGerald, Cummings, Greene and Bense.

A paper on "Testing of Building Stones," by F. Lynwood Garrison, Assoc. M. Am. Soc. C. E., was presented by the author, and discussed by Messrs. O'Rourke and Garrison.

A paper on "Tests of Condensation in Cast-Iron Radiators," by Wm. J. Baldwin, M. Am. Soc. C. E., was presented by the author, and discussed.

A paper "On the Marking of Street Lines," by C. M. Broomall, Jun. Am. Soc. C. E., was read by title.

MR. T. GUILFORD SMITH.—I would like to say a few words in reference to traveling libraries, and, of course, the next question will be asked, what have they to do with the engineering profession? I will state that the State of New York, through its University, distributes libraries, numbering from 20 to 50 and 100 volumes, to any part of the

State of New York where there is no public library, provided a sufficient number of people resident in that locality guarantee the return of the books and pay the freight. In the past two years over 100 traveling libraries have been put to work, and we have received the libraries back in good order and have not lost a book. I think that is a very remarkable showing.

In reference to the connection between the traveling libraries and the profession of engineering, I think that any of us who have been on work in sparsely settled portions of the country would have esteemed it a great blessing could we have obtained a library for the use of men forced to remain on the outskirts of civilization for so long a time. If members of the Society are so situated now, all they have to do is to state the fact, write to the Regents of the University, give certain security, agree to pay the freight, and the books are sent to them. As to the selection of the books, that is left somewhat to the person applying. An applicant in a certain part of the Adirondacks wanted a law library. We were obliged to decline that request, as we thought it was not exactly fair; but if a farming community wants a farming library, that sort of books are sent, so that selections can be made.

You may ask, what is the good of all this, merely providing gratification for those who happen to be temporarily resident in these out-of-the-way places? The answer is, a traveling library induces a public library. The Regents are authorized to give out that whatever money is raised in a community, up to \$200, they will double it; if you raise \$5, the State will give you \$5. If you wish to buy your books, the State will agree to buy them for you, through its agents, so as to get the greatest amount for the money. After you have a permanent library established, the permanent library becomes the center of university extension. Any study you may wish, may be taken up and carried forward. A lecturer on any possible topic will be furnished and all necessary papers sent. The number of university courses in the State is very large, and, as you know, the university extension movement is being carried forward in other States as well as our own.

I should be very glad if these remarks could be considered a part of the discussions of this Convention and appear in the minutes. I simply desire to put before the greatest number of people in the Society the fact that a traveling library exists, and can be obtained almost without money and without price.

On application to the "Public Libraries Department of the University of the State of New York, Albany, N. Y.," a pamphlet can be obtained giving full information on this important subject.

The Convention then adjourned.

BUSINESS MEETING HELD DURING THE ANNUAL CONVENTION OF THE SOCIETY AT NIAGARA FALLS, NEW YORK, JUNE 20TH TO 25TH, 1894.

FIRST SESSION, THURSDAY, JUNE 21ST, 1894.

WILLIAM P. CRAIGHILL, Pres. Am. Soc. C. E.—Gentlemen will please take seats. We have a duty to perform which is required by the Constitution, so that it is a duty imposed upon every member present. I will read the article of the Constitution :

“At the Business Meeting of the Annual Convention seven Corporate Members, not officers of the Society, shall be appointed by the meeting, who, with the five last living Past Presidents of the Society, shall be the Nominating Committee. This Committee shall present to the Board of Direction, on or before the first day of October ensuing, a list of nominations for the offices to be filled at the next annual election. These nominations shall be so made as to provide, with the officers holding over, a resident Vice-President and six resident Directors.”

At the Annual Meeting of the Society, January 18th, 1893, the following rules for the selection of the Nominating Committee were adopted:

“*First*.—At its March meeting in each year the Board of Direction shall divide the territory occupied by the membership of the Society into seven geographical districts, each of which shall contain, as nearly as may be practicable, an equal number of Corporate Members of the Society; and shall recommend to the Business Meeting of the Annual Convention that the Nominating Committee shall be made up of one Corporate Member from each of said geographical districts.”

The geographical districts, as determined by the Board of Direction, are as follows:

District No. 1.—New York City and Brooklyn.

District No. 2.—All the remainder of the State of New York, New Jersey and Canada.

District No. 3.—Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut and all foreign countries.

District No. 4.—Pennsylvania, Delaware, Maryland and the District of Columbia.

District No. 5.—Michigan, Ohio, Indiana, Illinois and Wisconsin.

District No. 6.—Minnesota, Iowa, Missouri, Kansas, Nebraska, North and South Dakota, Washington, Montana, Wyoming, Idaho, Colorado, Utah, Oregon and Nevada.

District No. 7.—Virginia, West Virginia, North Carolina, South Carolina, Georgia, Alabama, Mississippi, Louisiana, Florida, Texas, Tennessee, Kentucky, Indian Territory, Oklahoma, New Mexico, Arizona, Arkansas and California.

“*Second*.—The Business Meeting of the Annual Convention shall meet on the second day of the Convention, and, after transacting such

business as may come before it, shall hold an adjourned session at a stated hour of a day before the date fixed for the close of the Convention. At this first session of the Business Meeting the geographical districts previously established by the Board of Direction shall be announced, and the Corporate Members present shall be requested to assemble by districts and agree upon the names of two Corporate Members, either of whom will be, if elected by the Convention, a proper and suitable member of the Nominating Committee. To facilitate the assembling and organization of such district meetings the President shall name from the Corporate Members present at the Convention from each district one who shall act as temporary chairman at the meeting of his district, and the Secretary shall turn over to such temporary chairman any communications he may have received from Corporate Members of that district relating to the appointment of a member of the Nominating Committee."

The duty is, as you see, imposed upon the President of appointing a temporary chairman for each committee which consists of members of the separate districts, and I will now read that list. I hope the gentlemen who are named are all present, and that they realize the responsibility which rests upon them. I may say that this is an important duty which we are now engaged upon; it leads to the nomination of officers of the Society for the ensuing year. The machinery is cumbersome and it ought to be improved, but it is a machinery that we must now use. It is the duty, therefore, of every member to assist in the running of that machinery to the best of his ability and to the best of the ability of the machinery.

District No. 1.—Clemens Herschel.

District No. 2.—Thomas C. Keefer.

District No. 3.—Desmond FitzGerald.

District No. 4.—D. E. McComb.

District No. 5.—D. J. Whittemore.

District No. 6.—K. E. Hilgard.

District No. 7.—W. W. Coe.

In order that the matter may be thoroughly understood I will read further, defining the duties of the temporary chairman of the district committees and of those committees themselves:

"Each temporary chairman thus appointed shall call a meeting of the Corporate Members present from his district, and at each of the said meetings the names of two corporate members of the respective districts shall be chosen as suitable persons, either of whom is presented as an acceptable member of the Nominating Committee; and the chairman of the district meetings shall notify the Secretary of the Society of the action taken.

"Provided, however, that if it be found that any district is represented at the Convention by less than five Corporate Members present, such district meeting shall make no nomination for membership in the Nominating Committee, but shall, through its chairman, report the facts to the Secretary; and the chairman shall return to the latter any communications he may have received bearing upon the question, which communications shall be presented to the Convention.

"*Third.*—At the adjourned session of the Business Meeting of the Convention the nominations presented by the several district meetings shall be announced and the meeting shall proceed to elect by written ballot one Corporate Member from each district as a member of the Nominating Committee. A majority of the ballots cast shall be necessary to a choice."

On Saturday at 10 A. M. is the second session of the Business Meeting. In the interval between this meeting and that time the chairmen of these districts will call together the members of the respective districts, and each district will nominate two Corporate Members to be presented to the Convention, from whom will be chosen one as a member of the Nominating Committee.

I think I have stated the matter clearly and I hope it is fully understood by the Convention.

The names of the temporary chairmen for the several districts will be posted upon the board so that there may be no mistake about it.

If the chairmen of the district committees will come forward, the Secretary will now give them the papers to which, under the Constitution, they are entitled.

(The chairmen of the several districts then came forward and received the papers from the Secretary.)

This matter having been disposed of, so far as it can be at this time, the meeting is now open for further discussion.

Mr. DESMOND FITZGERALD.—Is it proper to make an announcement in order to save time and posting?

The CHAIR.—I think it would be a very proper thing to do; if the chairmen of the committees would now announce the place of meeting and the time.

Mr. FITZGERALD.—I wish to give notice to all members of my district that we will have a meeting immediately after the adjournment of the meeting of the Board of Direction this evening; we will assemble here.

The CHAIR.—I will take this opportunity to say that according to the programme and as required by the Constitution, there is a meeting of the Board of Direction to be held this evening at 8 o'clock. It is a matter of importance and it is requested that every member of the Board of Direction be punctual in attendance.

The SECRETARY.—The meeting will be held at a room which is near the office which has been set apart for us.

Mr. CLEMENS HERSCHEL.—I will not announce the time of meeting of District No. 1 at present, because it has been suggested to me that all the chairmen should consult as to when that time should be and perhaps have it all at the same time. I propose, however, to make the announcement by poster in the hotel corridor, and also at some meeting of the Society, after consultation.

Mr. D. J. WHITEMORE.—For the district from which I am ap-

pointed chairman I will make the announcement by bulletin in the hotel corridor.

Mr. K. E. HILGARD.—I will request the members from District No. 6 to assemble this evening after the close of the meeting of the Board of Direction.

Mr. FOSTER CROWELL.—Mr. Chairman, I will call attention to the possibility of that putting it at rather a late hour; some of the meetings of the Board are quite lengthy, and it may make this meeting at a very late hour. The members of the Board of Direction should have a chance to attend these meetings if they desire to do so, and I would suggest that perhaps it would be better to have them at some other time than after the termination of a Board meeting. I would also call attention to the fact that there is another day intervening after to-day, between now and Saturday.

The CHAIR.—Of course it is a matter for the chairmen to decide themselves, but as the business presses, I think the sooner it is done the better. Experience shows, I think, that when we have an excursion, we do very little else, so I am of the opinion that the suggestion of Mr. Fitzgerald is the best, to hold these meetings after the meeting of the Board of Direction or before; if the members will consider the matter and think about it before the meeting, it is a thing that would not take five minutes.

Mr. HERSCHEL.—I think there is no time like the present time, occasionally, and I propose to have the meeting of Section No. 1 now; if the members of that section will follow me we can have the meeting.

The CHAIR.—I think the suggestion of Mr. Herschel is a very excellent one. If the Convention takes this occasion to adjourn, as it has the right to do, and the chairmen will call their committees together immediately, the whole business can be done at the recess.

Mr. MENDES COHEN.—We are right back to the old plan of five corners.

Mr. JOHN BOGART.—I move that this Business Meeting now adjourn or take a recess until the next time.

Mr. WHITTEMORE.—Before adjournment I wish to call Section No. 5 to meet, immediately after this meeting, on the piazza over the rapids.

(The chairmen of the different sections announced the places of meeting.)

The CHAIR.—It is moved and seconded that the Convention adjourn. Adjourned.

SECOND SESSION, SATURDAY, JUNE 23D, 1894, 10 A.M.—Vice-President Charles Macdonald in the chair.

The CHAIR.—The Society will come to order as an adjourned business meeting, as provided for under the Constitution.

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The CHAIR.—The Society will come to order as an adjourned business meeting, as provided for under the Constitution.

The first business in order is the consideration of the nominations

for members of the Nominating Committee as reported by the committees appointed at the first session of the Business Meeting. The result of the work of those committees is shown upon the blackboard. The Secretary will now read, for the benefit of all present, the reports of those committees.

The Secretary read the nominations from the different districts, as follows:

- No. 1.—Clemens Herschel, O. F. Nichols.
- No. 2.—W. A. Brackenridge, E. Kuichling.
- No. 3.—John R. Freeman, Henry Manley.
- No. 4.—C. M. Bolton, R. L. Hoxie.
- No. 5.—V. G. Bogue, R. L. Read.
- No. 6.—N. W. Eayrs, John W. Kendrick.
- No. 7.—Hunter McDonald, T. M. R. Talcott.

You have heard the rules adopted at the last Annual Meeting, in January, 1893. It is provided in these rules that, after a report of the committees, an election shall proceed by written ballot. It is, therefore, now in order for you to decide on how the election shall proceed; the selection of one of each of the two names, or the substitution of any other names for those placed on the list, is in order.

Mr. JOHN THOMSON.—Will that include the entire list, or each district separately?

The CHAIR.—That is for you to decide.

Mr. THOMSON.—I move we vote, when we do vote, to include the seven districts. (Seconded and carried.)

The CHAIR.—Are you prepared to vote by ballot for the seven districts at once?

Mr. DESMOND FITZGERALD.—I move that the ballot be now taken up.

Mr. F. W. SKINNER.—I do not understand that this gives us a choice of voting at all; if we vote for the seven districts we cannot choose between the two names.

A MEMBER.—Yes, we can.

Past President MENDES COHEN.—You have got to put down seven names on your ballot.

The CHAIR.—You have heard the motion, that we proceed to ballot for seven names from the seven districts. (Carried.)

You will please prepare your ballots; the assistants will provide pads for the purpose. Members will please take notice that none but Corporate Members are expected to vote, or have a vote.

A MEMBER.—Should the ballots be signed by each member?

The CHAIR.—No, sir.

I will appoint Messrs. Skinner and Reece, Tellers, if they will be kind enough to serve.

It is in order now to take up the discussion of the proposed amendments, the first being Article II of the Constitution.

Mr. COHEN.—I would suggest, Mr. President, that the provision of the Constitution under which all amendments are made shall be read, so that the membership present will understand just what we are doing, if we are going to offer amendments.

The CHAIR.—Mr. Secretary, will you read the Article.

The Secretary read Sections 1, 3, 4 and 5 of Article IX, on amendments.

"SECTION 1. Proposed amendments to this Constitution must be reduced to writing, and signed by not less than five Corporate Members, and be submitted and acted upon as follows :

"SEC. 3. Amendments presented to the Secretary not less than 60 days previous to the date of the Annual Convention shall be sent by letter to the several Corporate Members of the Society, at least 25 days previous to the Annual Convention. Said amendments shall be in order for discussion at the Business Meeting during such Annual Convention, and may be amended in any manner pertinent to the original amendments by a majority vote of the Business Meeting during the Annual Convention, and, if so amended, shall be voted upon by letter ballot in form as amended by said Business Meeting; if not so amended, they shall be voted upon by letter ballot as submitted. The vote to be counted at the first regular meeting in October.

"SEC. 4. If, after discussion of a proposed amendment at either of the general meetings of the Society, the meeting shall so decide by a majority vote, it may refer the amendment to a committee for further consideration, which committee shall report at the next general meeting, whereupon the amendment shall be voted upon as hereinbefore provided.

"SEC. 5. An affirmative vote of two-thirds of all ballots cast shall be necessary to the adoption of any amendment.

"Amendments so adopted shall take effect 30 days after their adoption, provided that the officers of the Society, at the time any amendment may be adopted, shall continue in office until the next annual election."

The CHAIR.—If there are any members who still desire to vote, who have not yet voted, they now have the opportunity. The Tellers are about to complete their scrutiny of the ballots and the polls will be closed in a few minutes.

Discussion is now in order on amendment to Article II, Section 1. What is your pleasure, gentlemen, in regard to this amendment? It is simply a question of whether the word "subscriber" shall be stricken out or not. What is your pleasure?

Mr. A. P. BOLLER.—I think the proposers of the amendments should be requested to make an explanation of the reasons for them; there must be some good reasons for the amendments presented, and I will call upon any one of them to explain the reason for the change.

The CHAIR.—The names of the gentlemen who are on the Committee are: W. E. Worthen, Edward P. North, J. J. R. Croes, C. H. Myers, G. W. McNulty, C. J. H. Woodbury, A. A. Stuart, A. Fteley, J. W. Schaub, Charles Warren Hunt, F. Collingwood.

The SECRETARY.—As no one rises, I would like to say that at the time of the adoption of this Constitution the Committee having it in charge thought it desirable to insert the word "subscribers" as a means of making it easier to adopt some method by which local societies in other parts of the country could be affiliated. As that fell through, the word does not belong in the Constitution, and in making the amendments it was thought best to remove it.

Mr. COHEN.—I would suggest, Mr. Vice-President, that as there seems to be no disposition to object to the proposed amendment, we pass on to the next. The first amendment which has been read is of Section 1 of Article II. As no one seems disposed to offer an amendment or further amendments to that, I move that it be passed over and that we proceed to the next paragraph, Section 8, and so on until we come to something that some one will have an objection to. (Carried.)

The CHAIR.—"Sec. 8. Strike out the word 'who' in the second line of the section and insert the words 'though they' before the word 'may.'"

Mr. COHEN.—That is a similar and merely verbal change, for the purpose of clearing up.

Past President WILLIAM METCALF.—There seems to be no disposition to discuss the striking out the words "subscribers." I move that all amendments referring to the class of subscribers here be sent out to ballot; that is, all reference to subscribers.

A MEMBER.—I would like to ask whether there are any subscribers on the list now?

The CHAIR.—The motion, as I understand, is that all the changes indicated in Article II shall be sent out to letter ballot.

Mr. METCALF.—All the changes in all the proposed amendments, referring to subscribers only; that will end that matter and get it out of the way. (Carried.)

Mr. BOGART.—I move that Section 8, which you have just read, on top of page 2 of the circular, which is purely a verbal—

The CHAIR.—That has been passed upon.

Mr. BOGART.—Pardon me, that section refers to Fellows, not to Subscribers. I move that that be sent out to ballot.

The CHAIR.—You have heard the motion made by Mr. Bogart, that Section 8 also be included in the list to be sent out to letter ballot.

Mr. CLEMENS HERSCHEL.—Before that is acted on, we would like to know what Section 8 refers to.

Mr. BOGART.—I will read it: "Fellows shall be contributors to the permanent funds of the Society who may not be eligible for admission as Corporate Members."

This is now proposed to read that: "Fellows shall be contributors to the permanent funds of the Society, though they may not be eligible for admission as Corporate Members." There are a number of Fellows

who are eligible to membership and who are Corporate Members. It merely means that a Member may become a Fellow in addition to his membership, while as the Constitution now reads he cannot. It is merely to conform the Constitution to the facts as they exist to-day. A number of our Members have become Fellows in order to contribute to the funds, and this amendment merely makes a conformation to facts.

A MEMBER.—Are there any subscribers at all?

The SECRETARY.—There are subscribers to the publications, but not subscribers in the sense of this section.

Mr. COHEN.—I would just say one word, in the hope that it may possibly clear up a little what we are doing and facilitate matters in the end. There are a great many amendments, which were suggested with the more important amendments. The more important amendments will involve considerable difference of views among the members present, and discussion thereon will not only be valuable, but it will be very important in determining, as I believe, the action of the Society. I am inclined to think myself that the result will very probably be that the questions will be referred finally to a committee, perhaps to report at the next general Business Meeting of the Society in January; and as it occurs to me that it may not be expedient for us to pass upon the minor matters and order them passed out to ballot, while the more important and much greater part will be properly submitted to a committee, therefore I would suggest that we go on with the reading of these amendments, hear discussion upon them, and, if it be the pleasure of the Society to refer the matter to a committee, which I think is probable, then the Committee will have the chance to be enlightened upon the views of the Members as conveyed in this discussion. So, if it meets with the views of the Members present, I think we will save time by simply reading and inviting comment on these amendments.

The CHAIR.—The motion before the house is as to sending out Section 8 to letter ballot. (The vote was taken.)

The ayes have it, I think.

A division is called for.

All in favor of the motion made by Mr. Bogart, to send out the amendment as indicated in Section 8, will signify it by rising.

Mr. COHEN.—May I say one word before the vote is taken. Under the provisions, if you order that sent out to letter ballot, a letter ballot will have to be sent out within a certain number of days after this meeting. If the other, the important amendments, are referred to a committee, as I have thought they will be, they will not go out until after a meeting six months hence, and we will be dabbling in the Constitution and making changes in the wording, etc., now and again later; therefore, I think we will make a great mistake if we vote to send the smaller portion out now.

Mr. FOSTER CROWELL.—I may say in regard to that, we have already ordered that a number of amendments be sent out to letter ballot.

The CHAIR.—The division will have to proceed.

A MEMBER.—The motion, as I understand it, was as to the subscribers as well as to Section 8?

The CHAIR.—The Chair has stated the motion and will count the vote. All opposed signify by rising.

Forty-eight in favor; 28 against. The motion is declared carried. Section 9—

Mr. BOGART.—That is covered already, sir. Section 9 refers to nothing but subscribers, and under Mr. Metcalf's resolution that is included in what is sent out.

The CHAIR.—Then Article III comes next.

"Section 1. Strike out all of the first sentence after the word 'Direction' in the second line, and insert the word 'only' after the word 'elected' in the second line."

A MEMBER.—What is the effect of that?

The CHAIR.—The Secretary will have to explain the change involved in this amendment.

The SECRETARY.—The section as it now stands, reads as follows:

"Honorary Members shall be proposed by at least 10 Members, and shall be elected by a unanimous vote of the Board of Direction and such Past Presidents of the Society as shall be at the time Members and residents in North America," etc.

It would read "Honorary Members shall be proposed by at least 10 Members, and shall be elected only by a unanimous vote of the Board of Direction."

Mr. BOGART.—The explanation of that is very simple. At the time of the first adoption of this rule in regard to the method of the election of Honorary Members, the Past Presidents were not members of the Board of Direction. Since that time all Past Presidents have become, by this Constitution, members of the Board of Direction. It is tautology to say "the Board of Direction and such Past Presidents of the Society," etc., because the Past Presidents are members of the Board of Direction. This merely makes good English of it. I make the motion that this be sent out. (Carried.)

The CHAIR.—Section 2. "Strike out all of the first paragraph after the words 'applicant shall' in the eighth line of the section, and insert, 'furnish the names of at least five Corporate Members to whom he is personally known. Each of these shall be requested by the Secretary to address a letter to the Board of Direction, on a form prescribed by said Board, stating the extent of the writer's personal knowledge of the applicant and of his professional work. If at least five of the Corporate Members named as references do not furnish the requisite endorsement, the Secretary shall call upon the applicant for additional names, and not until written communications shall have been received

from at least five Corporate Members shall the application be considered by the Board.

"Insert the word 'five' after the word 'by' in the sixteenth line of Section 2."

The Secretary read Section 2 as it now stands in the Constitution.

Mr. COHEN.—Mr. Vice-President, I move that the amendment be referred to a committee of seven members, to report at the next general Business Meeting of the Society as to the advisability of passing that amendment to ballot.

Mr. G. S. GREENE, Jr.—I think that this amendment is an excellent one, and one that is so simple and so clear that it hardly needs to be referred to a committee of seven members, and, moreover, I think there is need of its being adopted by the Society as quickly as possible. I beg leave to recommend that this go as quickly as possible to the Society.

Mr. COHEN.—The only question about that is whether the verbal expression of the amendment is in precisely the best form, whether it precisely expresses what is meant? I think there is room for a difference of opinion on that score, and as it is very difficult in a body as large as this to perfect those little modifications, I have made the motion.

Mr. GEORGE S. MORISON.—It seems to me it would be a pretty serious mistake to refer this amendment, or any other, to a committee until we have had an opportunity to discuss it here. This motion of Mr. Cohen's, if passed now, would, not necessarily, but practically, have the effect of referring these amendments to a committee, while it is of the utmost importance that they should be discussed here. I think, therefore, that though it may be right in the end to refer some amendments to a committee, to refer them before discussion would result in just what we ought not to do. I therefore second Mr. Greene's motion that this go out to the Society.

Mr. COHEN.—But one word more, and I shall not have much to say. Before referring at all to the desirability of a committee, I said that it was, in my judgment, extremely desirable that the views of members should be brought out. I think it is extremely undesirable that these things should be passed to vote by those present with no opportunity for hearing the pros and cons. The discussion can take place very readily upon the motion to refer to a committee.

The CHAIR.—The motion to refer is before you for discussion.

Mr. METCALF.—It seems to me that the passing of Mr. Cohen's motion, as Mr. Morison suggests, would effect this, that there would be little or no discussion on these very important changes in the constitution that are now brought before this, the largest meeting of the Society that we have ever had, I believe. If we refer this now to a committee of seven, not named, nor its constitution, we shall have five

or six committees to work on five or six different subjects, instead of having some thoroughly adjusted committee in the end to take up the whole matter. It seems to me better to run along with the general discussion of these subjects than to hand them over to committees.

Mr. CROWELL.—I should heartily endorse the last idea, and I would call attention to the fact that the adoption by this meeting of a resolution to pass an amendment to ballot does not adopt it for the Society. The discussion here is most valuable; it is most desirable in every way; it simply has the effect of getting the endorsement of this very large assemblage to the advisability of bringing the amendment before the Society in a ballot, in the way the Constitution prescribes.

Professor J. B. JOHNSON.—I call for an explanation of the significance of this amendment.

The CHAIR.—The question before you is whether you wish to refer this amendment to a committee or not.

Mr. FITZGERALD.—It seems to me there should be some reasons given.

The CHAIR.—The reasons have been given.

Mr. COHEN.—An explanation is asked of the reason for moving its reference to a committee. The object was simply to prevent this meeting voting to pass it out to ballot, so that it could come in in some way for discussion. This particular amendment is not a very important one, but it is important that the verbal form of this amendment should be very carefully considered, more carefully considered than it appears to me has already been done, and I know of no way of effecting that except by action of a committee.

The CHAIR.—The Members will understand that the amendment was before this meeting for discussion when motion was made to refer it to a committee and remove it from discussion.

Mr. MORISON.—I do not think that motion is before the house. I think the motion before the house is the motion made by Mr. Greene as an amendment of Mr. Cohen's motion, to submit the amendment to the Society by letter ballot.

The CHAIR.—I did not understand Mr. Greene to offer an amendment, merely an argument against Mr. Cohen's motion.

Mr. GREENE.—I intended to offer it as an amendment.

The CHAIR.—The Chair, then, will put the amendment which Mr. Greene offered, seconded by Mr. Morison.

Mr. METCALF.—Is that amendment now up for discussion?

The CHAIR.—Will Mr. Greene state his amendment?

Mr. GREENE.—That this amendment to the Constitution be submitted to the Society by letter ballot, according to the provisions of the Constitution.

In regard to this thing, I think, in a matter so simple as this we are not likely to get more knowledge from any discussion we may have here;

these amendments were sent to me several weeks ago, and I suppose they were sent to every member of the Society, and it seems to me we are just as able to pass upon it now as at any other time.

Mr. G. H. BENZENBERG.—It seems to me there is a general desire that the Society discuss the question.

The CHAIR.—The motion now before the house will permit of that discussion, an amendment by Mr. Greene which lays the amendment before you for discussion.

Mr. MORISON.—I think that the whole question will be brought before this house by the adoption of Mr. Greene's motion. The adoption of this motion does not place the vote immediately before the Society; it simply amends Mr. Cohen's motion. After Mr. Cohen's motion has been amended in that form, the amended motion will be before the house, and then will be the proper time for discussion.

Mr. COHEN.—That is not an amendment, that is a substitution.

The CHAIR.—The Chair decides that Mr. Greene's amendment has brought up the amendment for discussion now.

A MEMBER.—How would that amendment, or that resolution, if adopted with the amendment, read, so we can understand what we are voting on? Presuming that the resolution offered by Mr. Cohen is adopted as amended, how would it read?

Mr. HERSCHEL.—Would some member kindly now tell us what is the effect of the proposed amendment of Section 2, Article III? I have not been able to discover, and for the purpose of starting the discussion of what is proposed I will say that I only discovered this, that candidates are no longer required to give a history of their professional life, and I do not know why this is to be stricken out. It seems to me that the history of the candidate, written by himself, is a useful document for filing in the archives of the Society, and I would call for information from the gentlemen who are knowing to this proposed amendment, why it was left out?

Mr. BOGART.—I take the liberty of replying, because I happen to have studied this very matter recently.

With all regard to Mr. Herschel, may I say he is mistaken. Section 2, as amended, will read exactly as it does now, down to the words "applicant shall"; you do not touch the history. This amendment begins—I will read the section as it will read when amended.

(Section 2 was read as it will read if amended as proposed.)

The effect of that is simply this, that a man who refers in his application to five members of the Society, cannot have the advantage of that reference until five members of the Society have consented that they be referred to. The reason for this was that in several cases that have come before the Board of Direction during the last two years, gentlemen who have applied for membership have used as references the names of some of our members who were not willing to be referred

to. In one case in particular, a gentleman applied for membership and referred to one of our members—the member is present now—and this member could not remember him; it turned out afterwards that he had, years and years before, been a young assistant rodman or something of that sort for a very short time, but it had been for so short a time that the member did not feel that it was right that he should be referred to as an endorser, but under the Constitution the Blue List went out with that member's name as reference. This is an attempt to avoid that trouble.

MR. FITZGERALD.—The resolution I think is an excellent one, in that it leaves the form to be prescribed by the Board of Direction and not in the shape of desultory letters. I hope, unless there are some other good reasons why this should be referred to a committee, that it will go out with the others to letter ballot.

MR. METCALF.—This amendment is intended entirely for the protection of the members of the Society. It has happened that when an applicant sent in his application with a certain number of names of members as references, the gentlemen referred to have declined to endorse the applicant in any way at all. It became the custom, finally, to send out with the list the names of only those who had responded; the result was that the applicant knew who refused to endorse him. This amendment, as I understand it, is to make that a little better; no names will go out to the Society as endorsers, but under the provision the Society will know that before the Board considers it, at least five members have sent to the Board confidential communications endorsing the applicant. It is a protection for the members of the Society that they may feel free to say exactly what they know about every applicant.

THE CHAIR.—The amendment proposed by Mr. Greene is that the proposed amendment to Article III, Section 2, be submitted to the Society by letter ballot.

MR. COHEN.—That is a substitution, sir, not an amendment.

THE CHAIR.—You have heard the motion, gentlemen. (The vote was put. Carried.)

Inasmuch as the amendment has disposed of the original question, it will be unnecessary to put that.

MR. MORISON.—I want to make a point of order; whether, if Mr. Cohen's motion has been amended by the adoption of Mr. Greene's amendment, we are not obliged to vote again on the amended resolution, so as to carry it in a proper form?

MR. COHEN.—I would like to have it read first, sir.

THE CHAIR.—If the gentleman will make a motion I will entertain it. The present business before us is Article III.

MR. MORISON.—I think there is a motion before the house; the amendment which has just been adopted—the amended motion is before the house.

Mr. CROWELL.—It is quite evident how this last motion would be disposed of. I would suggest the withdrawal of the original motion and the substitution or the offering of another motion which covers Mr. Greene's amendment which we have just adopted. The motion is so contradictory to the amendment.

Mr. COHEN.—Out of charity to all concerned, sir, I withdraw the original motion.

The CHAIR.—The business now before us is Section 3, Article III. "Strike out the words 'and the names of the references or endorsers' in the fifth and sixth lines."

Mr. BOGART.—Under the Constitution, I understand this is open for discussion. I have just been looking at the article in relation to amendments; it requires no motion to have these amendments discussed, at all. The Constitution says, "they shall be in order for discussion."

Mr. ROBERT MOORE.—Will somebody explain exactly the effect of this amendment?

Mr. JOHN THOMSON.—The object, Mr. President, as I recollect it, is that the names referred to by the applicant, that have hitherto appeared on the Blue List shall not now appear on any future Blue List of the Society. The record of the applicant goes out, presumably, in proper form, but the names of his references do not appear on the Blue List.

Mr. BOGART.—That is because the Blue List must go out before all these letters can be secured from those to whom the applicant has referred, and before the Secretary can know whether the members are willing to come out as his endorsers.

A MEMBER.—You might as well let the Directors elect the members; you cannot tell whom you are electing at all; we go a great deal by the references.

Mr. BOGART.—They can go out on the ballot list.

Mr. THOMSON.—This refers to the Blue List. When the record is complete and if the applicant has passed the Board of Direction, he is then sent to the Society with a complete record.

Mr. MORISON.—I believe the references now do not appear on the final ballot. Does this mean the transfer of the referees' names to the final list? My own preference would be to retain it on both.

Mr. CROWELL.—The argument that the gentlemen used in reference to the presence of the names on the Blue List aiding the member in voting for a candidate is really a weakness so far as the Blue List is concerned, because it has the effect of making the endorsement of some of those to whom he has referred stronger on account of the presence of two or three names. We are apt to give an endorsement partly from knowledge and partly because somebody else has endorsed. It is to the interest of the Society, and of the members themselves, that the

endorsements made should be independent. The argument would be in favor of not putting the names on the Blue List.

Mr. MOORE.—But they will go on the ballot list?

Mr. BOGART.—Mr. President, the provision for the ballot is as follows:

Read Section 4. "The ballots shall be letter ballots, in a form to be prescribed by the Board of Direction," etc.

Now, of course, I cannot speak for the Board, but I can say that when this subject was discussed in the Board it certainly was the intention to put on the ballot list the names of members who had consented to be referred to. Under the present constitution as it now stands, the preliminary notice, or Blue List, must contain the name of every person to whom the applicant has chosen to refer, and, as I have said, case after case has occurred where men have referred to members of the Society who have written to the Board that they did not consider that man a proper person to come into the Society, and yet the Blue List, under the provisions of the present constitution, must contain the name of every man to whom the applicant has chosen to refer. That is the effect of the present status of things, and I see one or two members here who could state that that is their experience. Yet those who have not known about it have voted for that man, as our friend says, because he referred to some particular member. If the Blue List goes out, upon which nobody really votes, in my opinion—if the Blue List goes out without the names of a lot of references, and the ballot list goes out with the names of the members who have consented to be references, then we will have the object desired.

Mr. CROWELL.—I was going to say, in continuation of what Mr. Bogart has stated, it is a matter of history in the previous discussion of this form that when the names were first printed on the Blue List and some of the members so referred to had declined to serve and their names did not appear on the ballot list, then the names of those persons who have declined to serve are known to the applicant. There are many cases where a considerable delicacy is involved in that situation. Cases have occurred where persons who had their names so used objected on the ground that it worked an injustice to them. It was on that account the Board ceased to put the names on the Blue List. It was for this reason the amendment arose; it was the only way the matter could be satisfactorily disposed of.

Mr. METCALF.—If Mr. Bogart's explanation is correct, I am very sorry to hear it, and I hope this whole thing will be thrown out, because it makes matters a great deal worse than before. Every applicant knows when the proper list goes out that there are five men who have agreed to be referred to, but if there are a whole lot more who would not be referred to, he knows that too. When a man makes application for membership and makes a reference, every man will say,

"If I have got to suffer and make an enemy, I will let my name go out and act as a reference," simply because they are going to publish the names of references.

I think from the discussion that we had in the Board when I was President that the view of this amendment was that the Board can take no action until five Corporate Members have written satisfactory letters, and that until those letters have been received the name cannot go on the Blue List, and after the five letters are received the name goes on the Blue List. When the Blue List goes out it is a fair notice that the Board has received these five statements, the five statements are satisfactory, and, in the judgment of the Board, that person is a proper person to be balloted for; and surely we can trust the Board to make a statement and not compel them to expose every other member of the Society who may have given them information. I hope Mr. Bogart's explanation is wrong.

Mr. BOGART.—I did not say the names were to go out on the ballot list. I read that "the ballots shall be letter ballots, in a form to be prescribed by the Board of Direction," and what I said was that the Board of Direction could send out the names on the letter ballot. I said I could not speak for the Board of Direction, but said the Board could send the names out under the Constitution as it stands.

Mr. HERSCHEL.—Sitting here and listening to the explanation of Section 3, Article II, it seems to me that this is a case where Mr. Cohen's motion would be entirely in order, and while I cannot repeat the exact wording of it, I would prefer that he should make it. I desire to have it made in some shape and will make it myself, assuming that the nature of the motion is known to the Secretary.

Mr. COHEN.—I do not know what motion may be before this body at present, but it does seem to me that we will save a great deal of time if, before passing on these separate amendments and ordering them to ballot, we will take them up, one after another, for discussion. If, after they be fully discussed, somebody moves that they are so clear that they can be passed to ballot, it can be done. But I think it will be found that having ordered one or two to ballot you will go on and discuss others which may be liable to different constructions and may best be referred to a committee; while if we go on and discuss them, one after the other, we can at the last determine whether everything is so clear that the whole may be passed to ballot, or that the whole had better be referred to a committee for verbal alteration, in accordance with the views of the Society as expressed here. Otherwise we shall have some amendments passed, and perhaps others rejected, and the result of the whole would be unsatisfactory.

Mr. MOORE.—I would suggest that this is ordinarily accomplished by resolving into a meeting of the whole, as a formal committee of the whole Society. That done, the Society then takes action; it secures the informal discussion, which is extremely desirable, in this way.

The CHAIR.—Do I understand that Mr. Herschel wishes to make a motion in regard to Section 3, Article III?

Mr. HERSCHEL.—I do make the motion that was made previously by Mr. Cohen with reference to another section.

The CHAIR.—That motion, as the Chair understands it, is that this amendment shall be referred to a committee of seven, to report at the next Annual Meeting; am I correct?

Mr. COHEN.—I believe that that was the form of the resolution that I offered.

Mr. HERSCHEL.—I will make it a little easier. I move that this matter be laid upon the table and we proceed to the next section.

The CHAIR.—Put the vote.

A rising vote was taken; 24 for to 45 against.

Mr. W. W. CURTIS.—Mr. President, I would like to ask a question, to this effect. As I read the Constitution, amendments can be offered here, provided they are pertinent to the amendments presented. Now, it strikes me as very essential that the Constitution itself should expressly state whether the actual ballot is to have the names of endorsers or not.

The CHAIR.—The business at present is the discussion of Section 3, Article III.

Mr. CURTIS.—This is pertinent to it.

I believe it absolutely necessary that that should be distinctly stated. I am not in favor of striking out this clause in the Constitution which gives the names of the endorsers in the Blue List, unless it is distinctly understood what way the matter is to be determined afterwards. I would like to ask the Chair for information whether this is germane and a pertinent amendment which would come in under the constitutional provision for amendments, if, after the adoption of this particular amendment, Section 3, Article III, can be amended to provide whether the names can be gotten in, or cannot go again on the ballot list.

The CHAIR.—That is germane.

Mr. CROWELL.—If it is in order, I move that the entire provision of the amendment, the part that applies to Section 3, which says: "Strike out the words 'and the names of the references or endorsers' in the fifth and sixth lines" be not adopted; that will retain the phraseology as it now is. It seems that with the previous portion of the amendment, it is immaterial whether the names are published or not, and therefore that provision need not be stricken out.

I move, therefore, that the amendment, so far as expressed in Section 3, be not adopted. (Seconded.)

The CHAIR.—You have heard the motion, that Section 3, as amended, should be sent out to letter ballot, with a recommendation that it be not adopted. That is as I understand the motion. Any discussion?

A MEMBER.—I rise to a point of order. That motion is out of order; the motion should be, that it be not sent out.

Mr. CROWELL.—My motion is to not adopt this section, which provides for the striking out. The reason for making it in that form is, as it now stands, the previous part of the amendment provides that no names of candidates shall be acted upon until written communications shall have been received from at least five Corporate Members of the Society; the applicant cannot appear upon the Blue List until that is done. Now, it is not necessary to procure the benefit of that portion, that the names of the references and endorsers shall not appear on the Blue List, simply because only the five men who have agreed to endorse the man should appear on the ballot list. Therefore I have made this motion, that we do not adopt this amendment.

The CHAIR.—The Chair is under the impression that when any amendments are presented for consideration, it is not possible to take final action upon them by this body; they must be referred to the Society at large for final action. I expressed the motion in the way I did in order that the Society might see that, after a full discussion, it was thought advisable to recommend that this proposition be not adopted. It would not be proper for any body of the membership to take final action in regard to amendments when the special method is prescribed by the Constitution. (Question called for.)

The question, therefore, is as to whether the change in Section 3 shall be sent out to letter ballot, with a recommendation that it be not adopted.

Mr. CROWELL.—This is an amendment to the amendment; it is to strike out that portion as printed that refers to a portion of the entire amendment on Article III, the particular amendment that refers to Section 3.

Mr. METCALF.—Is the effect of the motion to compel the putting of the names of the references on the Blue List when it does go out? Then I hope it will not prevail, for that leaves us in the same old trouble. I hope the motion, as now before the house, will not prevail, but that we send the amendment out, with a recommendation that it be adopted.

Mr. W. W. CREHORE.—If the Board of Direction can withhold a name from the Blue List until the five names come in, nobody will be elected to the Society without having had five members recommending him.

Mr. HERSHEY.—It seems to me, the more we discuss this matter, it is a case for Section 4, of Article IX:

"If, after discussion of a proposed amendment at either of the general meetings of the Society, the meeting shall so decide by a majority vote, it may refer the amendment to a committee for further consideration, which committee shall report at the next general meeting, whereupon the amendment shall be voted upon as hereinbefore provided."

If it is in order—I don't know that it is—to offer a motion which shall dispose of the matter we are now discussing, under Section 4 of Article IX. * * *

Mr. CROWELL.—Mr. Chairman, there is a motion before the house, which I withdraw.

Mr. HERSCHEL.—I would move to refer the proposed amendment to a committee for further consideration, under Section 4, Article IX.

Mr. COHEN.—May I offer an amendment, if it meets with the views of our friend who has offered the original? The amendment would be, that it be referred to a committee to which shall be submitted the consideration of such other amendments to the Constitution as may meet with the approval of the Society in general meeting now assembled. So, that, if Mr. Herschel's resolution is passed, then it will mean one and the same general committee, which shall have consideration of the whole matter which shall be passed upon and commented upon by the Society; which committee will put it in the proper form in accordance with the views of the Society, as here expressed, and present it for final action at the next general business meeting.

The CHAIR.—Mr. Crowell's motion having been withdrawn, Mr. Herschel's is in order.

Mr. L. L. TRIBUS.—Is there any reason why this meeting should not discuss thoroughly every question here, and pass on independent amendments, referring those without action here to a special committee appointed to so arrange the wording of the amendments that they shall be in proper form?

Mr. HERSCHEL.—I have a great deal of sympathy with the idea that a committee shall be appointed which shall take into consideration all the amendments brought out at this meeting, and which committee shall report as stated here in Section 4 of Article IX. Any amendment offered to my motion which will tend in that direction, I will accept with pleasure.

The CHAIR.—The motion before the house is, that this section and any other section which may hereafter be so referred, shall be referred to a committee of seven, to report at the next general meeting.

A MEMBER.—How will the committee be appointed?

Mr. COHEN.—By the President.

Mr. TRIBUS.—I will move, as an amendment, that the committee to be appointed be instructed to simply arrange the wording and not change the intent of the motions passed at this meeting.

Mr. SAMUEL WHINERY.—It is quite evident from the way this discussion is proceeding that the members here are not quite certain just what they do wish to adopt in this matter. I doubt, in view of the discussion here, if the gentlemen who proposed this amendment are certain whether the verbal form is what they would prefer. As the text of the Constitution has already been criticised to some extent,

it seems to me an important matter that it should be considered carefully by a committee, who shall report at a future meeting. I am in favor of Mr. Herschel's motion.

A MEMBER.—I would like to ask if this Section 2 is not part of Section 3. Can both be——

The CHAIR.—That has been disposed of already.

If there is no further discussion, the question will be as to referring Section 3, and any other section which shall be so referred, to a committee of seven, which committee shall report at the next annual meeting.

Mr. CREHORE.—Is the amendment made by Mr. Tribus before the house?

The CHAIR.—I have not heard that amendment seconded.

(Seconded.)

Mr. C. W. HUNT.—Is that amendment necessary?

The CHAIR.—If the gentleman will kindly withdraw the amendment, it seems to the Chair the committee will have the power essential.

Mr. J. P. FRIZELL.—I object, Mr. Chairman, to restraining the committee. I would give them full power to consider this subject thoroughly.

Mr. TRIBUS.—In view of the Chair's decision, I will withdraw my amendment.

The CHAIR.—Then you have heard the original motion which is before you. (The vote was put. Carried.)

This section, therefore, is referred, with other sections that may be so referred, to a committee to be appointed by the President.

All the other sections under this article, and Sections 1, 2, 3 and 7 under Article IV, are covered by a motion already passed.

Mr. MORISON.—I would like to make a motion in this connection, if entirely in order; it is for the instruction of this committee. That it is the sense of this meeting that whatever amendment is proposed or arranged by this committee, it shall contain some provision under which, either in the Blue List or letter ballot, the names of the endorsers shall appear.

Mr. BOGART.—Mr. President, just a word of discussion. I am very glad to hear that motion, and I rise to discuss it for a moment. This was expressed in the thought and in the discussion of one of our members who spoke in regard to this particular amendment. Now there are no endorsers provided for here. When this new Constitution was adopted, the whole method of application blanks was changed by it. Up to the adoption of this new Constitution any person desiring to come into the Society had to secure the written endorsement upon the application blank of five members of the Society. Two or three years ago that was changed so that a man is now asked to secure the endorse-

ment of nobody, and the Secretary has to go to work to see whether his references will endorse him or not, and I think there has been a little confusion in our discussion here as between the words reference and endorser. As I understand Mr. Morison's resolution, it is that the names of the endorsers shall be published. How are they to become endorsers?

Mr. MORISON.—I don't think it is essential to go into the details of how it shall be done. I think it is of the utmost importance that at some time before the members are called upon to vote upon applications they shall know who the endorsers are.

Mr. CURTIS.—I second Mr. Morison's motion; I think it is exceedingly desirable. I have known in a number of instances names to go out with a record of employment which would be very unsatisfactory; they have passed the Board, and, while I know nothing against them, I do not vote against them; but if I see the names of, say, five, or two or three whom I know, and whose character and whose standing I know, I feel much more confidence in that particular man's qualifications; if such a man has consented to have his name go out as an endorser or reference, I have much more confidence in the applicant. I had intended to offer an amendment which should cover that and provide that in sending out the ballot list the names of five members who have endorsed the gentlemen should be given. I would have it, say, specifically five members; the Board, if they like, can call for ten members; I don't think so; I would say five members.

The CHAIR.—The motion is that it is the sense of this meeting that the names of the endorsers or seconders should appear on the schedules that are presented to the Society for ballot for Members. (Carried.)

The next business is Article VI, Section 4:

"Insert as an entirely new paragraph at the beginning of the section as follows: 'The Secretary shall be a Corporate Member of the Society. He shall be elected annually by the Board of Direction at the meeting to be held within twenty days after the Annual Meeting, provided for in Section 8 of Article VI, or at an adjournment thereof, and shall hold the office for one year, or until his successor is elected.'

"Strike out the words 'The Secretary,' in the first line of the section, and insert the word 'he.'"

Mr. MOORE.—If in order to discuss this motion before any action be taken by this meeting, which I presume is the case, I would mention the fact that the members of the Society, resident in St. Louis, at a meeting held for the purpose of considering this amendment with others, whilst endorsing in the main the proposition which seems to have been in the minds of those who proposed it—that the Secretary shall be chosen by the Board of Direction—wished, however, to secure the consent of a majority of the Board of Direction; that the Secretary shall not be chosen simply by a majority of a quorum which, I believe, would be three members, a quorum being five, a majority

being three. As it stands, the Secretary may be simply the choice of three members of the Board of Direction and therefore this meeting suggested the adoption of this amendment, with a proviso that a majority of the whole Board of Directors shall be required to elect the Secretary; this vote to be given, if necessary, by letter, so that the verbal or written consent of a majority of the Board of Direction shall be necessary to elect the Secretary.

Mr. CROWELL.—I second that and I think it is a very desirable provision.

Mr. L. L. BUCK.—I would suggest an amendment to this amendment, by striking out in the first line, "shall be a Corporate Member of the Society." Then it will read: "The Secretary shall be elected annually by the Board of Direction," etc.

I suggest this for the reason that my idea of the matter is that we should get the man who will make the best Secretary, whether he is in the Society or whether he is out of it. While every member probably would rather have a Secretary in the Society, if they can get him—one of us—and would rather have an engineer for a Secretary, yet it would be better not to have it understood that we elected him because he was a professional engineer, but because he was a Secretary. (Seconded.)

Mr. COHEN.—Mr. Chairman, it is very desirable, no doubt, that the Society should have as its Secretary the best man to be found for the place. He has a great variety of duties to perform and he must be skillful in their performance; but there is one duty that he has to perform—I should say, a great many duties to perform—which can only be well performed by a Corporate Member of the Society. The President is nominally the executive officer of the Society; he may live anywhere within the boundaries of this great country and may rarely visit the headquarters of the Society in New York. The Vice-Presidents of the Society are active professional men, who cannot be expected to take an active part in the administration or the Society, except occasionally. There must be some one at the Society headquarters who is the acting executive head of the Society, and that officer can be no other than the Secretary. Now, if the Secretary is simply a paid employee of the Society, he cannot perform all the functions required of him with that sort of dignity that will be especially fit, for instance, when he comes to extend courtesies to strangers visiting us, which can best be done by a Corporate Member of the Society. Now, when you combine those two features in one individual you probably accomplish the whole thing. I do not think that it is so difficult to find the qualifications we require amongst the Corporate Members of the Society that we should give to ourselves the privilege of going outside and having simply a good business man, a good clerk, act as a Secretary. We want a great deal more than that. (Applause.)

Mr. MORISON.—I believe it is a fact that almost every person here will remember that there is one institution which is considered from the number and standing of its engineers to be the leading organization. I believe it is well known that the Secretary of that institution has been a man who has performed the duties which Mr. Cohen has mentioned marvelously well. I believe it is also an undoubted fact that he never has been, or could be, a corporate member of the Institution.

A MEMBER.—Is there not a motion before the house ?

The CHAIR.—The discussion is on the general subject, and amendments to this amendment are in order for discussion with the original.

Mr. BUCK.—I agree with what Mr. Cohen has said in regard to the necessity of having a man fitted to carry out the duties of the office of Secretary; I don't think any one will disagree with this; I think we want a man who will make a good Secretary, and if we cannot get him inside the Society, then get him outside. If it is necessary that he should be made a member, he can be made a member and put right in as Secretary. We do not take away any of the advantages of getting a good Secretary; take it as it is now, if he is a corporate member he can go in as Secretary; if he is not, make him one and put him right in; take him from outside if he is the best man; we can make him a member if necessary.

Mr. METCALF.—I will merely call attention to the fact that the acceptance of Mr. Buck's amendment and its passage would make no difference as to the status of the Secretary, because another part of the Constitution provides that he shall be a member of the Board of Direction, therefore he must be a member of the Society. So striking out these words, "shall be a Corporate Member of the Society" will not do; he must be a member because he is a member of the Board.

Mr. F. W. SKINNER.—I agree very heartily with Mr. Cohen and partly with Mr. Buck. I think that the Secretary of the Society should certainly be a Corporate Member. I think that Mr. Buck's plan of making any suitable Secretary timber into a Corporate Member would be a rare occurrence; while the man might have the qualifications for a Secretary he might not have the qualifications for member. The question is not so much whether a man would make a good Secretary in all its details, as that we should have a man of excellent executive ability, a good administrator, possessed of diplomacy. The Secretary's time will be well administered in managing affairs; he is supposed to be well equipped with assistants. Let us, by all means, have a representative man, a good engineer for our Secretary. This Society has furnished scores of chief engineers, men of excellent attainments, executive ability and responsible heads of departments, and from whom we get the best results.

The CHAIR.—The amendment to the amendment will be put first, which is Mr. Buck's motion that we strike out the words "shall be a Corporate Member of the Society," making it unnecessary that the Secretary shall be a Corporate Member.

Mr. D. J. WHITTEMORE.—I wish to make one remark. As I understand it, Mr. James Forrest has been an Associate Member of the Institution of Civil Engineers for 40 years.

Mr. MORISON.—If I am not correct I am perfectly willing to take back what I said. I remember looking into the matter some years ago.

Mr. WHITTEMORE.—His name appeared in the Institution papers over 40 years ago, and I am very sure I have seen him mentioned as an Associate Member of the Institution.

Mr. MORISON.—He is connected with the Institution, I know. It was my impression that he was an Associate.

A MEMBER.—I am under the impression that he was elected an Associate Member after his election as Secretary. I know he is an Associate Member.

Mr. BUCK.—The main idea I had was to obviate the necessity of a man being an engineer. We want an engineer, of course, but we want a good secretary first of all.

Mr. G. W. RAFTER.—If I might say a word, as we are referring to precedents, I want to call attention to the fact which has existed in another division of the English societies, the Royal Microscopical Society. This society has a secretary, a man whose income from his practice as a lawyer is stated to be about £25 000 a year. He was a man who had a love for the work, and he made the finest secretary that any scientific body ever had. I merely mention this as showing that good secretaries are born, not created. Mr. Forrest, who has been referred to as the ideal secretary of the Institution of Civil Engineers, was a born secretary. The point really is, therefore, not to follow the precedent of throwing the place open to anybody on the ground that you are going to get a better secretary out of a man who is not a member of the Society, rather than a member, but to look out for a good secretary. The point that has been made, that under ordinary circumstances you will get a better secretary from a man who is a Corporate Member of the Society is, I believe, well taken.

Mr. W. S. POPE.—This proposition is not exclusive. Suppose Mr. Buck's amendment is carried, the Secretary may still, and probably will, be a member. It does not mean to say that the Secretary shall not be, but that he need not be, a member; there is no exclusion about it; we can still elect a member.

Mr. CROWELL.—It seems to me it would remove one strong inducement to men who are members to be secretaries, if the motion of Mr. Buck prevails.

Mr. BUCK.—I don't see that there would be any harm in that way. If we are called upon to be secretaries, fitted for it, we would probably accept the position just as well under those circumstances.

Mr. B. L. CROSBY.—While I would like to support the amendment, I would suggest that I do not think it should be adopted without amending Article V, Section 5, which requires that "at least one Vice-President, the Secretary and the Treasurer and six Directors shall be Resident Corporate Members during their term of office."

The CHAIR.—The question now is on the amendment to the amendment proposed by Mr. Buck. All in favor of the amendment to the amendment will signify by saying "Aye."

The motion is lost.

Mr. MOORE.—If it is the sense of the meeting, I will make a formal motion of the proviso of which I spoke. I would move that it be the sense of this meeting that this Committee should incorporate in this amendment the proviso that a majority of the whole Board of Direction are to vote upon the election of the Secretary.

The CHAIR.—The Chair will have to ask Mr. Moore to withdraw his first amendment, the amendment in reference to referring this to any committee.

Mr. MOORE.—I did not propose to refer this to any committee, but simply to make this the sense of the meeting.

The CHAIR.—The paragraph as it reads is now open for discussion and your amendment changes the wording; the question of what shall be done with it afterwards is for the Society to act upon.

Mr. MOORE.—I do not make a motion for a reference to a committee. I simply mean to move that this proposed amendment be amended by adding these words: "Provided that a majority of the whole Board of Direction shall be required to elect the Secretary, this vote to be given, if necessary, by letter."

The CHAIR put the vote. (Seconded and carried.)

The motion now is in order to dispose of this section; either to refer it to a committee—

Mr. MOORE.—I would move that this whole section, as amended, be referred to the consideration of the Committee already provided to take into consideration the former amendments. (Seconded and carried.)

The CHAIR.—Article VII, Section 1. "Strike out all of the first paragraph and insert the following:

"The Secretary shall be elected in accordance with the provisions of Article VI, Section 4."

"The Board of Direction shall hold a meeting between the first and tenth of October in each year, at which it shall resolve itself into a committee for the nomination of officers to be balloted for at the next annual election.

"A quorum of such committee shall consist of seven members of

the Board, exclusive of the Treasurer and Secretary, neither of whom shall have a seat or vote on the Committee. The nominations for the offices to be filled shall be so made as to distribute them geographically throughout the United States and Canada, under a method to be regulated from time to time by the Board of Direction; provided, that, including the officers holding over, there shall always be a resident Vice-President and six resident Directors.

"Strike out the whole of the second paragraph and insert:

"The nominee shall be immediately advised by the Secretary, and if any one or more of them decline the nomination or prove from any cause ineligible, the Board of Direction shall select substitutes.

"The list of the nominees shall be mailed to all Corporate Members not later than October 31st.

"Strike out the whole of the fourth paragraph, beginning with the words, 'Should the nominations.'"

Mr. HERSHEL.—Mr. President, before that is acted on may I make another suggestion. The two parts that have been read seem to have no connection with each other; one refers to the method of electing a secretary; the other to a radical change in the method of nominating officers. I would suggest that these two parts be discussed separately.

Mr. MORISON.—As the first part of the amendment really is a part of the amendment which has just been acted on, I would, before proceeding to the rest, move that this amendment, reading: "The Secretary shall be elected in accordance with the provisions of Article VI, Section 4," be referred to the same Committee to which has been referred the last amendment.

The CHAIR.—It is moved that the first two lines, referring to the Secretary, shall be referred to the Committee to which the last amendment was referred.

Mr. WHINERY.—Mr. President, I simply want to ask whether the members present understand the propriety of the motion that has just been passed. Is it the desire of this Convention that this matter of changing the method of electing the Secretary shall be postponed until another year? That is the effect of the motion just carried. If it is desired by a large part of the membership of this Society that this amendment, which is believed to be a good thing, should be passed immediately, in time for the election to the next Secretaryship, if this motion can be sent out to the Society at once, the Secretary for the next year will be elected by the Board of Direction. If referred to a committee, the Secretary will be elected in the usual way. I merely wish to ascertain whether the members understand the effect of what has been done and wish it to stand.

Mr. CROWELL.—I move for a reconsideration of the motion. (Seconded.)

The CHAIR.—It is moved and seconded that we reconsider the action taken on Section 4 of Article VI.

(The vote was put. Division called for. Eighteen against to 45 in favor.)

Mr. WHINERY.—As I understand, the original motion is in order for discussion; I will be very brief. I think if there is one idea that has prevailed in this Society for years among a large number of members, it is that the Secretary should be an appointee of the Board of Direction and not an elective officer. There was a very strong feeling in that regard when the new Constitution was adopted, and I think that every one in the Society will welcome this change. If it is a good change the sooner we bring it about the better, and, if that is so, we want to put this amendment in shape to be sent out to ballot at once, and as a consummation the next Secretary will be appointed by the Board of Direction. If we refer it to a committee it will be impossible to report it in time, and the result will be that the Secretary will be elected as usual. I move that this amendment be passed to ballot. (Seconded.)

The CHAIR.—You have heard the motion, that this amendment, as amended by Mr. Moore, be passed to ballot. (The vote was put. Carried.)

I understood Mr. Morison to make a motion in reference to the first part of Article VII.

Mr. MORISON.—I would move that the amendment reading, "The Secretary shall be elected in accordance with the provisions of Article VI, Section 4," be also passed to ballot. (Carried.)

The CHAIR.—The business now is in regard to the proposition relating to the Board of Direction, which I have already read.

Mr. MORISON.—It seems to me this is a subject which needs to be considered with the utmost care. I think that the most important matter before us has just been disposed of; that is, the election of a Secretary, and I am very glad it has been disposed of as it has. This next amendment relates to the subject of a Nominating Committee. It is a matter which it will probably be expedient for us to take time about, but it is one on which, I think, there should be a little discussion. Any one who has served on the Nominating Committee knows how unsatisfactory the present method is; every member of the Society who has ever voted, knows how involved it is if the Nominating Committee put out a ticket to which there is decided opposition. The present method of making a Nominating Committee would, perhaps, be good enough if the powers of the Nominating Committee were less than they are. The amendment now proposes to eventually abolish the Nominating Committee and makes the Board of Direction the Nominating Committee. Perhaps that is as well as anything, but if this is done it seems to me that the Board of Direction becomes far more a self-perpetuating body than is desirable. The method of appointing the Nominating Committee does not seem to be so very improper, provided the Nominating Committee can be kept in touch with the Society that has appointed it, but as nominations are at present conducted, such touch does not exist. The one thing which it seems

to me most desirable to have done is the depriving the Nominating Committee of the power of making nominations. The nominations should be made, as nearly as possible, by the whole Society, but if the whole Society is simply called on to make nominations, we may have 400 members nominating 399 people. The one solution of this difficulty is to make the Nominating Committee a committee on suggestions; to let that Committee suggest to the Society at large the candidates whose names are to be put on paper, and then let the Society at large, with their votes steered by these suggestions, make the nominations.

I would, therefore, move that the following amendment be substituted for the amendment of Section 1 of Article VII as printed in the distributed circular; and in making this motion I wish to say in advance that I consider while these details have been worked out as a solution of the question, but not as the only solution; that the principal feature of it is the one I have already stated, viz., that the Committee on Nominations should become a committee on suggestions:

“ARTICLE VII.

“SECTION 1. Strike out the first five paragraphs and substitute for them:

“At the Business Meeting of the Annual Convention in 1895 six Corporate Members not officers of the Society shall be appointed by the President, and these with the three last living Past Presidents of the Society shall constitute a Nominating Committee of nine; three of these members shall be appointed to serve for two years and three to serve for one year; at each subsequent convention three Corporate Members shall be appointed in the same manner to serve for two years. This Committee shall suggest, in writing, to the Board of Direction, on or before the first day of October ensuing, names for nomination for each office, in number equal to three times the number of vacancies to be filled at the next annual election. In these suggestions the number of Resident Corporate Members required by Section 5 of Article V shall be considered, and three Resident Corporate Members suggested for each office, which must be filled by a Resident Member.

“Directly after the first of October this list of suggestions shall be mailed to all Corporate Members of the Society, together with the names of the six Directors whose term of office is about to expire. There shall be sent at the same time a brief statement of the residence and professional record of each Corporate Member whose name is on the list of suggestions. There shall also be sent a blank letter ballot for nomination for the offices to be filled at the next annual election. Each nomination ballot shall be filled out by the Member voting with not more than one name for each office, but the Member filling out the same shall not be limited to the names on the list of suggestions. Each nomination ballot shall be signed by the Corporate Member voting, shall be enclosed in a sealed envelope, and shall be sent by mail to the Secretary or presented at the Society House. The nomination ballots shall be canvassed at the regular Business Meeting of the Society on the first Wednesday in November, by tellers, who shall submit a written

report giving the full result of such canvass. The names receiving the largest number of votes for each office, and conforming to the requirements of Section 5 of Article V of the Constitution, shall be reported to the meeting as the regular list of nominations for the offices to be filled at the next annual election. Should any nominee decline such nomination, the Board of Direction shall substitute for his name the name of the Member who would have been nominated had no votes been thrown for the Member so declining.

"At any time previous to the first day of December, any 10 or more Corporate Members may send to the Secretary additional nominations signed by such Members.

"At least 30 days previous to the annual meeting there shall be mailed to every Corporate Member whose address is known, a letter ballot with envelopes for voting. This ballot shall include all nominations made in accordance with this article. The names and residences of nominees and their grades of membership and their designation as Resident or Non-resident Members shall be given. The names in the regular list of nominations shall be placed first and arranged under the heads of the respective offices in the order of the number of nomination votes cast for each name. The other nominations shall be arranged alphabetically. There shall be no other distinguishing marks."

This method is not a new thing; it has been in use for a long series of years for the nomination of candidates for the board of officers of Harvard College. About 30 years ago the constitution of the board of officers of Harvard College was entirely changed, and, instead of being selected by the State, the board of officers were elected by the alumni of the college. That was simple enough. Under the law under which they are elected the votes are passed to ballot at Cambridge on commencement day; there are no letter ballots. We could not do that. The law makes no provision for nominations, but the Association of Alumni, an organized body, adopted a method of making nominations, and that method is substantially the same as that which I have provided here. The method of appointing the Committee on Suggestions has to be radically different, because the Alumni Association is a body which meets but once a year. After the Committee on Suggestions has done its work, another committee carries through that work, which in this Society would properly be done by the Board of Direction. Originally they suggested only twice the number of names that there were vacancies to be filled; that was subsequently increased to three times. Every year a circular of this kind (showing circular), containing a list of suggestions and containing a blank ballot to be filled out, is issued.

I have followed the course which has been successfully tried as closely as possible, but it may be amended, perhaps, to greater advantage. The main principle is that the nominations shall not be made by the Committee, but that the Committee shall be simply the tool of the Society in making its nominations. I have here a form of circular which is issued with the blank ballot to every member of the

Alumni Association, and I have also an article which gives a full description of the operation of the system, which I should be glad to have everybody read.

Mr. CROWELL.—Mr. Chairman, the matter which has been so carefully and fully stated by the gentleman who has just presented this amendment, is one of such importance that, it seems to me, it ought to be referred to a special committee, on account of the detailed features to which Mr. Morison has referred. It strikes me as containing a great many most valuable suggestions. It also strikes me as containing one very objectionable feature, and that is the requiring a professional record of the candidate. We all pass through that in coming into the Society, and after that we all stand on the same plane. To make professional attainments a test is going too far in one direction. It does not always follow that men who have attained the highest technical efficiency have those acquirements making them capable of acting as the best Directors. I think it is eminently advisable that this should be referred to a special committee. I would call attention to the fact that the present machinery for nominations must be used this year, and that there is no time lost by giving this amendment six months' consideration.

Mr. MOORE.—I second that motion, and I may add that the amendment proposed by Mr. Morison, which had already been adopted at a meeting of the members present in Chicago, was considered at a meeting of the members resident in St. Louis, and that the meeting voted to recommend for consideration and adoption the amendment as proposed and as read by Mr. Morison, of course as embodying the principle, and not necessarily all the details.

Mr. HERSHEY.—I am heartily in favor, Mr. President and gentlemen, of the manner in which Mr. Morison has taken hold of this subject, and I presume the result will be a reference to a committee, and I should only like to add one further suggestion which, if he agrees, should go before the Committee, namely, that the geographical distribution of this Society be preserved. As I understand the feelings of the Society, I think that is a popular feature; it looks to me like a useful feature. This is an American society of engineers, and everything tending to spread the action throughout the whole country should be preserved and assured.

Mr. MORISON.—There are one or two little points which have been raised. They are not essential points to the whole, but it has been, apparently, the idea that a professional record was intended to be a test of a man's capacity. No such idea was intended. The professional record was intended to be of the very briefest character, and simply sufficient to identify the man.

Another suggestion has been made to me by one of our Past Presidents, which I did not think of, and it could be embodied in this; the amendment as now drawn does not provide for the existence of ties.

Mr. METCALF.—It was before the house to refer Mr. Morison's amendment and this amendment to a committee.

The CHAIR.—The Committee already appointed.

Mr. METCALF.—I wish to offer a substitute for this amendment here which will not involve Mr. Morison's amendment, but which does divide the country into seven districts, so that there shall be no question where a representative of the Society comes from. I will simply offer a substitute. This is to go before that Committee.

"ARTICLE VII.

"SEC. 3. The Board of Direction shall hold a meeting between the 1st and 10th of October in each year, at which it shall resolve itself into a Committee for the Nomination of Officers, to be balloted for at the next annual election; neither the Secretary nor Treasurer shall be a member of this Committee. A quorum of such Committee shall consist of seven members of the Board.

"SEC. 1. Each year the Board shall divide the territory occupied by the membership of the Society into seven geographical districts. District No. 1 shall be the territory occupied by the Resident Members. The six other districts shall be as nearly as possible contiguous territories, and they shall contain as nearly as possible an equal number of members. The proposed six divisions shall be submitted to the business meeting of the Annual Convention each year for approval.

"SEC. 2. Not later than September 1st in each year the Board shall cause to be mailed to each member a blank form for suggestions for nominations for two Directors from each district, for two Vice-Presidents and for President. The replies to be sent to one of the Directors of the district in which the member resides, and by the Directors to be forwarded to the Secretary for the use of the Nominating Committee.

"SEC. 4. The Nominating Committee shall make the nominations, so that, including the officers holding over, there shall always be a President, Vice-President and six Resident Directors; and that there shall always be two Directors in each of the non-resident districts.

"SEC. 5. The nominees shall be immediately advised by the Secretary, and if any one or more of them decline the nomination, or prove from any cause ineligible, the Board of Direction, organized in committee as directed in Section 3, shall select substitutes in such a way as to maintain the distribution of Directors provided for in Section 4.

"The list of the nominees shall be mailed to all Corporate Members not later than November 15th."

Mr. HERSCHEL.—I would suggest that Mr. Crowell gives his reasons for referring the matter to a special committee, instead of the Committee to which is referred the other amendments generally.

The CHAIR.—The motion has already prevailed that subsequent reference should be to this Committee. There would have to be distinctive action, otherwise the amendment will go to the Committee already provided.

Mr. CROWELL.—I merely thought that this question was one that ought to be considered most carefully and by itself, but I am not wedded to the idea of a special committee; I am perfectly willing to withdraw the word "special."

I wish to say in answer to Mr. Morison as to the question of attainments, that if Mr. Morison or any other member of the Society were to be proposed as a candidate for the Harvard board, the highest record, probably, that he would like to give, the professional record, would be that he was a member of the American Society of Civil Engineers, and as all the members of the Board of Direction are already Members of the American Society of Civil Engineers, the record of attainments is unnecessary; indeed, it might, in the course of time and in the hands of a designing person, work injustice. I think it is not necessary, and I hope the Committee will not consider it desirable to include it.

Mr. J. RAMSEY, Jr.—There is a point which strikes me and on which I would like a little explanation. As I understand the plan, the selection of the names is made by the Committee and sent out to the members, and they vote for one name for each vacant office; the person securing the highest number of votes on the ballot is really the one elected. I think it should be the two highest votes on the first ballot; in other words, the parties voting on nominations should vote for two for each office, and those two should be put on the final ballot list. For instance, I may vote for Mr. Morison for one office and his name not appear on the list, and the name of another gentleman be on, that I do not care about, but if the two names are on I have a chance to vote. I would suggest the Committee consider the propriety of taking the two highest names.

Mr. MORISON.—I think if Mr. Ramsey has ever taken an active part in any organization which pursues the course of double names on the regular ticket, unless his experience has been very different from mine, he will have found it very unsatisfactory. The name of the member who receives the largest number of votes simply goes upon the regular ticket. They are in precisely the same position when they come before the Society for ballot, that the nominations made by the Nominating Committee are now. There is nothing to prevent as many opposition tickets as any one may desire to get up, and there is nothing to prevent anybody voting on the final ballot for any one he chooses.

Mr. RAMSEY.—But, suppose among the names there are two that are within one or two votes of each other, the one that has one or two votes more than the next lowest is put on the list. If the two were put on, the lower one might a little later, when he had all the other votes, go out and have a chance on the final ballot. (Question called for.)

The CHAIR.—The question is, that the original change as printed, together with the substitute offered by Mr. Morison, and the amend-

ment to that permitting the geographical division of the country, in the selection of officers, shall be submitted to the Committee already provided for that purpose, to report at the regular time.

Mr. COHEN.—Before putting the question on the final disposition of this matter, as I understand it, I think it is highly desirable, Mr. Chairman, that there should be some expression of opinion from the very large attendance of members here, with regard to the amendment as particularly proposed here, which places the nominations in the hands of the Board of Direction, which is radically different from the method submitted by Mr. Morison. We recognize the good features in Mr. Morison's proposed amendment, but it is radically different from that here laid down; and no matter what may be the intelligence of the Committee to which this may be submitted, it ought to be discussed here sufficiently at least to get the sense of the Society as to what is best to be done.

This amendment, if I understand it correctly, places the nominations really with the Board of Direction, and the theory of it was, as I understand, that the Board of Direction, being a representative body, being called from all over the country, and from the various geographical districts, was to represent the Society as a whole, and provided the possibility of the re-nomination of themselves could be provided against (supposing that the members of it would take such action), there was no better representative body to whom the question could be submitted than to the Board. It is within the knowledge of many members that the method of nominating in the past has not always been satisfactory, and while you have the radical change proposed in the amendment just read by Mr. Morison, it would be particularly desirable to have some expression of the sense of the Society with regard to the amendment.

Mr. MOORE.—I heartily agree with the expression of opinion of Mr. Cohen, and I would say that if this motion of Mr. Crowell's passes, as I think it probably will, I will make a motion which will test the sense of the Society in the way which Mr. Cohen suggests.

The CHAIR.—The motion is before you; all in favor of referring this matter to a committee, say "Aye." (Carried.)

Mr. MOORE.—In order to test the sense of the Society for the information of this Committee, I will move, that it be the sense of this Society that the general principles contained in the amendment proposed by Mr. Morison, be approved by this meeting. Those who are so minded can vote "Aye," and those opposed can vote "No."

Mr. FITZGERALD.—If you will allow me to make one suggestion, that the gentleman put his resolution in this form: That in the opinion of this meeting, the Board of Direction shall not be a committee for the nomination of officers.

Mr. MOORE.—I think the other motion covers that as well, and it

goes a little further, to the approval of a particular plan ; in this a plan is not approved.

Mr. FITZGERALD.—But it is referred to a committee for the purpose of investigation ; it seems to me that this is the simpler way.

Mr. MOORE.—Very well.

The CHAIR.—The motion before the house is as to whether the committee appointed shall be informed that this meeting is in favor of the general substitute submitted by Mr. Morison.

Mr. FITZGERALD.—Mr. Moore has accepted my substitute.

The CHAIR.—What is the substitute ?

Mr. FITZGERALD.—That in the opinion of this meeting, the Board of Direction shall not be a committee for the nomination of officers.

The CHAIR.—Gentlemen, you have heard the motion. (The vote was put. Carried.)

Mr. MOORE.—Now, I think we can advance a step further to the motion which I have already made ; that in the sense of this meeting, the general principles of the amendment heretofore presented by Mr. Morison be approved. (Seconded.)

Mr. CROWELL.—I think we can leave that to the Committee ; we have given them both to consider and we have stated just now what we think on one point. Let them decide. Don't tie their hands and make them follow Mr. Morison's suggestions. There are a great many suggestions in this amendment and I think we can safely leave it to the Committee to be appointed by the President.

Mr. MOORE.—But I think this is an expression of the opinion of this meeting, merely. I don't understand that it controls the Committee.

Mr. METCALF.—I would ask for a rising vote on this motion ; it is a very important matter. I don't know that a mere *viva voce* vote should adopt any plan. This is a very radical change, and if it cannot be left to the Committee, I ask for a division on it so that every man shall vote deliberately.

Mr. MORISON.—I believe this resolution simply expresses the opinion that this meeting favors the general features of the amendment as offered by myself, all details and everything else to be left to the Committee.

Mr. CROWELL.—The reference to the general features is too general.

The CHAIR.—A rising vote has been called for.

(The vote was put. Forty-eight in favor, and 31 against.)

The motion prevails.

The remaining portion, it seems to the Chair, might properly be referred to the Committee.

Mr. COHEN.—I have a motion to make, Mr. Chairman.

“Resolved, That the Committee to which has been referred the several pending amendments to the Constitution be authorized and directed to submit such other and further amendments as may be

necessary to perfect the instrument in full compliance with the views and instructions of this Society, as indicated at this meeting." (Seconded.)

The CHAIR.—You have heard the motion. (The vote was put. Carried.)

Mr. BOGART.—I move that all the other portion of the amendments be referred to the same Committee. (Seconded.)

The CHAIR.—It is moved and seconded that the remaining portion of the change, Section 7, Article VIII, be referred to the same Committee. (Carried.)

Mr. MOORE.—Is it understood how that Committee shall be provided for ?

The CHAIR.—The Chair will announce the result of the ballot for members of the Nominating Committee :

District No. 1.—Clemens Herschel.

District No. 3.—John R. Freeman.

District No. 4.—C. M. Bolton.

District No. 5.—V. G. Bogue.

District No. 6.—John W. Kendrick.

District No. 7.—Thomas M. R. Talcott.

In District No. 2 there is a tie, 46 votes for Mr. Brackenridge, and 46 votes for Mr. Kuichling. It is in order to propose a second ballot for the Second District.

Mr. BOGART.—I make that motion.

The CHAIR.—It is moved and seconded that a second ballot be taken for District No. 2. The gentlemen will please prepare their ballots, and I will ask the same tellers to count them. The names on the list are Mr. W. A. Brackenridge and Mr. Emile Kuichling ; any other names may be proposed. While these ballots are being cast, there are a number of resolutions referring to the courtesies that have been extended to us which may well be taken up and considered now.

Mr. MORISON.—Is a motion in order ? I would move that the amendment to Section 2 of Article III, which has been laid on the table, be taken from the table and referred to the same Committee to which the other amendments were referred.

The CHAIR.—It was not laid on the table.

Mr. METCALF.—We have generally agreed that the last Convention is always the best and pleasantest, the courtesies received are always the greatest, which is as it should be. We are always advancing and progressing. Certainly we all say this has been a very great Convention, and we have received a great many courtesies from the people in this vicinity. I would offer, Mr. President, a vote of thanks to the Cataract Construction Company and allied companies, which are those connected with them in the same work, for their cordial welcome, generous hospitality and the valuable facilities extended to our members in inspecting their works.

The CHAIR.—You have heard the motion, gentlemen. (Carried.)

Mr. J. M. KNAP.—Mr. Chairman, I wish to offer a vote of thanks to our valued fellow member, Mr. Theodore Voorhees, Vice-President of the Philadelphia and Reading Railroad Company, for his zealous efforts to promote the success of this Convention and especially for bringing about the provision of special trains from New York and Philadelphia, and return. (Carried.)

Past President General G. S. GREENE.—I offer the motion:

“*Resolved*, That the thanks of the Convention be presented to the Committee of the Board of Direction, Foster Crowell, Chairman; Leffert L. Buck and Joseph M. Knap, who have had general charge of all the arrangements for the Convention, for the very complete arrangements made by the Committee, which have greatly conduced to the comfort and convenience of members of the Convention.”

The CHAIR.—Gentlemen, you have heard the motion made by Past President Greene. (Carried.)

Mr. J. M. WILSON.—I will offer a resolution of thanks to the Lehigh Valley Railway Company and their General Superintendent, Mr. Rollin H. Wilbur, for their highly generous action in tendering the special trains from New York and Philadelphia for the free use of our members, and for the thoughtful care and attention for our safety and comfort on the part of the company officials. (Carried.)

Mr. WHINERY.—I have a vote of thanks to offer:

“*Resolved*, That the thanks of the Society be offered to the New York Central and Hudson River Railroad Company for the trains and service extended so generously between Niagara Falls and Queens-town.” (Carried.)

Mr. COHEN.—I have a resolution of thanks which it is desirable that we should offer to the Grand Trunk Railway Company for the generous provision of a special train for the return trip from Toronto, for the use of our members. (Carried.)

Mr. FITZGERALD.—I desire to offer a vote of thanks to the Niagara River Transportation Company and Mr. John Fry, Manager, for transportation on their steamers between Lewiston and Toronto. (Carried.)

Mr. L. L. BUCK.—I move a resolution of thanks to the Niagara Falls and Suspension Bridge Railway Company for the special trolley trains and free transportation to the members. (Carried.)

Mr. CROWELL.—I wish to move a vote of thanks to our local Committee of Arrangements, Messrs. W. A. Brackenridge, chairman; John Bogart, Samuel J. Fields, E. B. Guthrie, Joseph Hobson, William T. Jennings, W. C. Johnson, Benjamin Rhodes, Edward H. Keating, Albert H. Porter, Pemberton Smith and Walter McCulloh, Secretary, for its faithful labors and intelligent action which have produced the very satisfactory results in the details of the Convention. (Carried.)

Colonel H. G. PROUR.—I move a vote of thanks to the Niagara Falls

Tower Company for their courtesy in giving to members and guests free access to the observatory. (Carried.)

Mr. HERSHEY.—Ordinarily I don't believe in facilitating egress from this country to Canada. I, however, move that the thanks of the Convention be given to the Niagara Falls and Clifton Suspension Bridge Company for their generous extension of the free use of their bridge. (Carried.)

Mr. JOHN THOMSON.—I wish to offer a vote of thanks to the Niagara Falls Park and River Railway Company of Canada for their hospitality and generous tender of their trains. (Carried.)

Mr. W. S. POPE.—I move that a vote of thanks be extended to the Niagara Railway Suspension Bridge Company and the Niagara Falls International Bridge Company for their generosity in privileges granted our members. (Carried.)

Mr. H. D. WHITCOMB.—I move a vote of thanks be extended to the Niagara Falls Paper Company for the privilege granted of inspecting their extensive and interesting works. (Carried.)

Mr. HENRY W. WILSON.—I move a vote of thanks to the Cliff Paper Company for their cordial invitation to examine their works. (Carried.)

Mr. E. B. GUTHRIE.—I move a vote of thanks to the Miller & Brundage Coach Company for their generous tender of transportation. (Carried.)

Mr. BENJAMIN RHODES.—I move that a vote of thanks be tendered to the Hon. T. V. Welch, Superintendent of the New York State Reservation, for the freedom of the inclined railway and other special privileges. (Carried.)

Mr. A. P. BOLLER.—I wish to offer a vote of thanks to the Niagara Falls Hydraulic Power and Manufacturing Company for the privilege granted of examining their works. (Carried.)

The CHAIR.—I have to announce the result of the second ballot for the second district. Mr. Kuichling has 33 votes, Mr. Brackenridge 25. Mr. Kuichling is elected the member of the Nominating Committee from the Second District.

A MEMBER.—Before adjournment I would like to move a vote of thanks to Mr. Macdonald for his able occupancy of the chair.

The CHAIR.—There are some announcements to be made previous to that.

Mr. Crowell made some announcements about the reception; the trip to Toronto, etc. Also that the Hall Manufacturing Company of Lockport invite any members to visit their offices and factories at Lockport at any time that may be convenient and agreeable.

The Hall Manufacturing Company desired me to say that any members accepting this invitation would be considered its guests in going from Niagara to Lockport and return.

Mr. Crowell also made announcements as to the Trunk Line certificates. (Adjourned.)

THIRD SESSION, SATURDAY, JUNE 23D, 1894, AFTERNOON.—Vice-President Charles Macdonald in the chair.

Past President WILLIAM METCALF.—Before beginning the Convention session, I wish to say, as a member of the "Committee on Analysis of Iron and Steel," appointed by the Society several years ago to take up the subject of standards for the analysis of materials,—this is a sub-committee of the international committee which is hard at work on this subject in England, in Germany, and in this country. Dr. Dudley, of our Society, who is now at the head of our Committee, has sent in a report which, I think, will be interesting to the Society. As Prof. Langley, the chairman of the International Committee on Standards of Iron and Steel is present, he will present the report.

Prof. J. W. LANGLEY presented the report, as follows:

INTERNATIONAL STANDARDS FOR THE ANALYSIS OF IRON AND STEEL.

REPORT OF SUBCOMMITTEE ON METHODS.

No. 1.

As the work of the Committee on International Standards for the Analysis of Iron and Steel has progressed, it has apparently become evident that standard steels, whose analyses are known, do not completely solve the problem with which the Committee was charged. It will be remembered that the Committee on International Standards planned to obtain quite a large amount of borings of some four or five steels, and to have careful analyses of these borings made by seven different chemists in each one of the following countries, namely, England, France, Germany, Sweden and the United States, the idea being that the average analyses obtained by these 35 chemists, would be regarded as representing the chemical composition of these steels, and that after this work had been done, the samples being deposited in some satisfactory place in each country, if any chemist was in doubt about his work, he could simply send and get some of the standard sample, and make an analysis of it. If he found the same results that the Committee found, he would be at liberty to consider that his work on other steels was correct.

It will be recognized that the method made use of by the Committee on International Standards as outlined above is the same that has been used for many years with the standard yard or meter, or the standard pound or kilogram. But as the work has progressed, it has, as is stated above, apparently become evident that the possession and

use of a standard sample of steel, whose content is known, does not quite justify a chemist to conclude that his work on other samples is correct, independent of the chemical method he uses. A single illustration will, perhaps, make this point clear. If the phosphorus in the standard steel, for example, exists in a certain form, and the method used by the chemist who is in doubt, is such as would give all the phosphorus in the standard sample, obviously if his manipulation is correct, he would confirm the standard sample. If, on the other hand, the phosphorus in another steel which he is analyzing, does not exist in the same form that it does in the standard sample, and the method that he uses is such that it does not give all this phosphorus in the second sample, it is obvious that although he confirms the standard sample, he might be in error in his second sample. Many other illustrations might be given, but those who are familiar with the chemistry of iron and steel will readily understand that where accuracy is essential, the methods used by all chemists must be such as will give the amount of the substance sought, irrespective of the condition in which it exists in the sample, or standard samples must be furnished which contain the elements sought in all possible forms of combination.

In view of this state of affairs, after considerable consultation and discussion, it was decided to form a Subcommittee, who should take up the question of methods, and recommend to the chemical world standard methods to be used in the analysis of iron and steel. As representing the American Society of Civil Engineers in this Subcommittee on Methods, the following members of the Society were chosen:

WILLIAM METCALF, Pittsburgh, Pa.

THOMAS RODD, Pittsburgh, Pa.

A. E. HUNT, Pittsburgh, Pa.

CHARLES B. DUDLEY, Altoona, Pa., *Chairman*.

As representing the Committee on International Standards, the following members of that Committee were likewise chosen to constitute this Subcommittee:

W. P. BARBA, Midvale Steel Works, Nicetown, Philadelphia, Pa.

A. A. BLAIR, 406 Locust Street, Philadelphia, Pa.

T. M. DROWN, Massachusetts Institute of Technology, Boston, Mass.

P. W. SHIMER, Easton, Pa.

CHARLES B. DUDLEY, Altoona, Pa., *Chairman*.

The members representing the International Committee held a meeting for organization in the office of A. A. Blair, 406 Locust Street, Philadelphia, Pa., on December 13th, 1893. It was decided to send a circular to the iron and steel chemists of the country, asking for a brief outline of the methods which they prefer, and the reasons for all the important points of their methods.

Also that the work of the Committee should comprehend the recom-

mentation of standard methods to be used as the basis of commercial transactions, and when any of these methods could not be used in steel works in daily practice, on account of the time required, an alternative rapid method should be recommended, and its limitations defined.

Also that the members of the Committee should draw up each proposed standard method in writing, with some minuteness, and give the reasons for each important point, these written drafts to be sent to the Chairman, to be duplicated and sent to every member of the Committee. Later the points agreed upon are to be edited by some one member of the Committee.

Also that only one element should be embraced in a method.

Also that the first method to be taken up should be phosphorus in steel.

Following this meeting five samples of steel were obtained, three of which were furnished by Mr. Barba, one by Doctor Dudley, and one by Professor Langley, Chairman of the Committee on International Standards for the Analysis of Iron and Steel. These samples of steel have been analyzed by the various chemical members of the Subcommittee, and the results of these analyses, together with the methods, will form the second report of the Subcommittee. It will be understood that the object of these samples of steel, and their analysis, is to have some material on which to work, and on which the members of the Subcommittee agree, when questions in regard to standard methods come up. For this purpose a knowledge of what is in these samples is a necessary preliminary. A standard method being proposed, it will be applied to these samples of steel and its fate will be decided, according as it does or does not confirm the results of the five different chemists independently on these samples.

Meanwhile the circular for the iron and steel chemists was duly prepared and sent out, and replies have been received from 31 chemists. The replies of these chemists have and are being used by the members of the Subcommittee for suggestion and criticism.

It will be observed that thus far the work of the Subcommittee has been largely confined to getting started. It is hoped that at each succeeding meeting of the Society, a report of progress will be made.

CHARLES B. DUDLEY,

Chairman Subcommittee.

Approved:

JOHN W. LANGLEY,

Chairman International Committee.

Professor LANGLEY. —In addition to this, I may add that the portion of the material for America is now in this country and half of it will be deposited with this Society, as custodians of the material, to advise as to how it shall be distributed to the applicants entitled to receive it.

Mr. METCALF.—Mr. President, I happen to know that this is a matter of very great importance to the practicing engineer, who when he buys his material, especially upon specification, wants to know that he has some material which can be regarded as standard. This Committee is doing, as indicated in the report here, a very large amount of work. I think that the final results will be of very great interest to this Society, and, as Professor Langley has stated, this Society will become the custodian of a large part of the material.

I move the acceptance of this report, and its publication in due form for the information of the members of the Society. (Carried.)

Mr. DESMOND FITZGERALD.—Mr. President, I wish to make a brief report for the Committee on Badges. This Committee was continued at the last Annual Meeting as a committee to prepare and submit a design to the Society. The Committee has been very diligent in procuring designs. It has had a large number prepared, and, after due consideration, has come to the conclusion that it is better to leave off all designs from the badge entirely and have simply the words, "American Society of Civil Engineers, founded 1852," upon the badge. To keep the present form, simply making it slightly longer, not quite so wide, but keeping the blue enamel on gold, so that it will be little distinguished by its form from the old badge. I should like, Mr. President, to call for an expression of opinion in regard to this matter from this meeting, in which we have representatives from different parts of the country; and, therefore, in submitting this report, as the Society has already directed that a new badge be procured, and has appointed a committee to procure that badge, I move that the badge of the membership of the Society be one such as I have described, with the simple words "American Society of Civil Engineers, founded 1852," placed thereupon.

I wish to say further that it is our desire that these badges be made in the very best possible manner and to be an honor to the Society, and therefore we have arranged with Tiffany, if it is decided to manufacture these badges, to manufacture them in the very best possible way.

A MEMBER.—I second the motion.

Mr. G. S. GREENE, Jr.—I wish to ask, Mr. Chairman, whether members will be allowed to retain and wear their old badges? Is there any law against it? Is anybody going to stop it? I hope the motion of Mr. FitzGerald will be laid on the table. (Seconded.)

The CHAIR.—The motion is that the motion of Mr. FitzGerald be laid on the table. All in favor of laying that motion on the table say "Aye."

The noes have it.

The question is now on Mr. FitzGerald's motion; all in favor of that signify by saying "Aye."

The ayes have it.

Colonel H. G. PROUT.—I do not know whether it will be in order, but if not, you will set me right, Mr. Chairman. Mr. T. C. Clarke had prepared a resolution for presentation and a very short paper as a sort of argument.

His resolution is for the appointment of a committee to report to the Society at as early a day as convenient, whether in its opinion it is practicable for the Society to recommend to its members the adoption of a uniform scale of fees and commissions for the professional services of its members.

The CHAIR.—The gentlemen will please remember that, according to the programme, we are here simply for the presentation of papers. If it is your pleasure to take up questions like this—

Mr. FOSTER CROWELL.—I would move, in view of the somewhat small attendance here, that we proceed to the papers.

The CHAIR.—It is moved that we now proceed to the discussion of papers before the Society. (Carried.)

The Convention session was then resumed.

The following 237 members were in attendance at the Covention:

C. H. Allen, New York City; Horace Andrews, Albany; Henry C. Allen, Syracuse, N. Y.; Frederick J. Amweg, Philadelphia; G. Aertsen, Latrobe, Pa.; A. B. Atwater, Detroit, Mich.; A. V. Abbott, Samuel G. Artingstall, Chicago, Ill.; D. H. Ainsworth, Newton, Ia.; John W. Bacon, Danbury; D. S. Brinsmade, Birmingham, Conn.; P. F. Brendlinger, J. Breuchaud, Yonkers; William J. Baldwin, John A. Bense, John Bogart, A. P. Boller, L. L. Buck, Kennerley Bryan, New York City; William A. Brackenridge, George B. Burbank, Niagara Falls, N. Y.; W. H. Breithaupt, Berlin, Canada; George H. Blakeley, Paterson; L. B. Bonnett, Elizabeth, N. J.; Arthur Beardsley, Swarthmore; A. Bonzano, C. W. Buchholz, George Burnham, Jr., Philadelphia; Alba F. Brown, Pittsburgh, Pa.; N. W. . Brown, Atlanta, Ga.; David L. Barnes, Onward Bates, Chicago, Ill.; George L. Burrows, Saginaw, Mich.; G. H. Benzenberg, Milwaukee, Wis.; Alfred Craven, Carmel; J. N. Chester, New Rochelle; Thomas C. Clarke, Howard J. Cole, F. Collingwood, William W. Crehore, Foster Crowell, New York City; Robert Cartwright, Rochester; C. L. Crandall, Ithaca; Frank H. Clement, Niagara Falls, N. Y.; Robert A. Cummings, Philadelphia; Amory Coffin, Phenixville, Pa.; Mendes Cohen, William P. Craighill, Baltimore, Md.; David S. Carll, Washington, D. C.; W. W. Coe, Roanoke, Va.; L. E. Chapin, Canton; C. A. Carpenter, R. L. Cobb, Cleveland, O.; W. W. Curtis, Chicago, Ill.; Ben. L. Crosby, St. Louis, Mo.; A. L. Davis, St. Albans, Vt.; S. L. F. Deyo, New York City; George Davison, Charles Davis, Pittsburgh, Pa.; Benjamin Douglas, Detroit, Mich.; William de la Barre, Minneapolis, Minn.; David L. Ellis, Oil City, Pa.; N. W. Eayrs, St. Louis, Mo.; Robert Fletcher, Hanover, N. H.; Joseph P.

Frizell, Boston; Desmond FitzGerald, Brookline, Mass.; George H. Frost, A. Fteley, New York City; J. Leland FitzGerald, Schenectady; E. A. Fuertes, J. H. Fuertes, Ithaca; S. J. Fields, Buffalo, N. Y.; Clark Fisher, Trenton, N. J.; F. R. Fava, Jr., Washington, D. C.; Charles Francis, Davenport, Ia.; John T. Fanning, Minneapolis, Minn.; C. S. Gowen, Sing Sing; G. S. Greene, Jr., New York City, N. Y.; George Sears Greene, Morristown, N. J.; F. Lynwood Garrison, Philadelphia, Pa.; John E. Greene, Baltimore, Md.; Bernard R. Green, Washington, D. C.; Edward B. Guthrie, Buffalo, N. Y.; Charles E. Goad, Sir Casimir S. Gzowski, Toronto, Canada; Charles E. Greene, Ann Arbor, Mich.; George E. Gifford, Cleveland, O.; E. Gerber, Chicago, Ill.; Edwin A. Hill, New Haven, Conn.; Charles M. Harris, Bentley D. Hasell, Clemens Herschel, John T. N. Hoyt, Charles Warren Hunt, William R. Hutton, New York City; Caspar Wistar Haines, Philadelphia; Alfred E. Hunt, Pittsburgh, Pa.; C. B. Hunt, Washington, D. C.; William R. Hill, Syracuse; William E. Hoyt, Rochester; Alan H. G. Hardwicke, Niagara Falls, N. Y.; Joseph Hobson, Hamilton, Canada; A. Lincoln Hyde, Cleveland; John W. Hill, Cincinnati, O.; Charles Hermany, Louisville, Ky.; Horace E. Horton, Chicago, Ill.; K. E. Hilgard, St. Paul, Minn.; Edward F. Haas, Stockton, Cal.; J. C. Irwin, Albany, N. Y.; Owen L. Ingalls, Washington, D. C.; Chauncey Ives, Chambersburg, Pa.; W. H. Jaques, New York City; Washington Jones, Philadelphia, Pa.; Henry S. Jacoby, Ithaca; W. C. Johnson, Niagara Falls, N. Y.; William T. Jennings, Toronto, Canada; J. M. Jackson, Romeoville, Ill.; J. B. Johnson, St. Louis, Mo.; Walter Katté, Joseph M. Knap, New York City; Paul S. King, Easton, Pa.; J. de Bruyn Kops, Savannah, Ga.; Walter G. Kirkpatrick, Schenectady; E. Kuichling, Rochester; Louis H. Knapp, Buffalo, N. Y.; E. H. Keating, Toronto; Thomas C. Keefer, Ottawa, Canada; S. Munch Kielland, Helena, Mont.; Richard Lamb, New York City; Norman S. Latham, Brooklyn, N. Y.; R. W. Lesley, Philadelphia, Pa.; William B. Landreth, Schenectady, N. Y.; Cassins H. Lindenberger, Detroit, Mich.; Thomas D. Lovett, Cincinnati, O.; David W. Lum, Knoxville, Tenn.; Charles A. Mixer, Rumford Falls, Me.; Samuel L. Minot, Boston; Mace Moulton, Springfield, Mass.; T. H. McKenzie, Southington, Conn.; Charles Macdonald, George C. Mason, T. J. McMinn, Henry C. Meyer, Spencer Miller, Aug. Mordecai, C. H. Myers, New York City; Thomas H. McCann, Hoboken, N. J.; George E. Mann, Buffalo; Walter McCulloh, Niagara Falls, N. Y.; Henry G. Morse, Wilmington, Del.; James C. McGuire, Ellicott City, Md.; David E. McComb, Washington, D. C.; Gouv. Morris, Big Stone Gap, Va.; Mansfield Merriman, South Bethlehem; William Metcalf, Pittsburgh, Pa.; Fred. Morley, Ann Arbor; John J. McVean, Grand Rapids, Mich.; George S. Morison, Chicago, Ill.; John MacLeod, Marshall Morris,

Louisville, Ky.; Robert Moore, St. Louis, Mo.; Albert F. Noyes, Boston, Mass.; A. S. Nye, Jr., Purdy's Station, N. Y.; George B. Nicholson, Covington, Ky.; F. S. Odell, Mt. Vernon, N. Y.; John F. O'Rourke, New York City; Frank C. Osborn, Cleveland, O.; John P. O'Donnell, London, England; Henry G. Prout, Alexander Potter, New York City; George T. Prince, Philadelphia, Pa.; A. H. Porter, Niagara Falls, N. Y.; Albert H. Porter, Cleveland, O.; Willard S. Pope, Detroit, Mich.; C. D. Purdon, Fort Madison, Iowa; C. H. Prior, Minneapolis, Minn.; George H. Pegram, Omaha, Neb.; George A. Quinlan, Houston, Tex.; William Roberts, Waltham, Mass.; Nathaniel Roberts, Jersey City, N. J.; C. C. Rose, Scranton, Pa.; Palmer C. Ricketts, Troy; George W. Rafter, Rochester; Benjamin Rhodes, Niagara Falls, N. Y.; Benjamin Reece, Chicago, Ill.; Robert L. Read, Joseph Ramsey, Jr., Cincinnati, O.; A. F. Robinson, Topeka, Kan.; J. Parker Snow, Boston, Mass.; Frank W. Skinner, Charles H. Snow, New York City; Henry B. Seaman, Mt. Vernon, A. A. Stuart, Brooklyn; Fred. P. Spalding, Ithaca; William J. Stewart, Rochester; Pemberton Smith, T. Guilford Smith, H. R. Stanford, Buffalo; G. F. Simpson, Niagara Falls, N. Y.; J. Waldo Smith, Montclair; H. S. S. Smith, Princeton; E. Gybbon Spilsbury, Trenton; Oberlin Smith, Bridgeton, N. J.; Coleman Sellers, Philadelphia; C. C. Schneider, Pencoyd; Albert Smith, Saltsburg; W. Lucien Scaife, Pittsburgh, Pa.; Max. E. Schmidt, R. I. Sloan, Charles L. Strobel, Chicago, Ill.; G. H. Thomson, John Thomson, Calvin Tomkins, John M. Toucey, Stevenson Towle, E. E. Russell Tratman, Louis L. Tribus, New York City; John C. Trautwine, Jr., Philadelphia, Pa.; Gaylord Thompson, Rochester; T. Kennard Thomson, Buffalo; A. T. Throop, Niagara Falls, N. Y.; A. N. Talbot, Champaign, Ill.; Paul Voorhees, Buffalo; A. H. Van Cleve, Niagara Falls, N. Y.; William H. Wiley, William E. Worthen, New York City; F. M. Wilder, Buffalo, N. Y.; Henry W. Wilson, John A. Wilson, Joseph M. Wilson, Philadelphia, Pa.; H. D. Whitcomb, Richmond, Va.; E. D. Wileman, Toledo; S. Whinery, Cincinnati, O.; John F. Wallace, Chicago, Ill.; N. O. Whitney, Madison; D. J. Whittemore, Milwaukee, Wis., and George L. Wilson, St. Paul, Minn.

One hundred and thirty-one ladies of the families of members accompanied them at the Convention.

It will thus be seen that, including ladies, there were 372 persons present, aside from a considerable number of invited guests.

OF THE BOARD OF DIRECTION.

JUNE 5TH, 1891.—The Board met at 20.30 o'clock; nine members present.

The Committee on Library was authorized to remove from the shelves useless matter having no value for record, exchange, or

sale; a memorandum of all such to be made. Also to prepare a list of duplicates for sale or exchange, such list to be printed and sent to members in all grades, technical journals and libraries. Prices to be fixed when a proposition to buy is made.

Various routine matters were disposed of and the following applicants were elected: As Associates, Charles Francis McKenna, Ernest Leslie Ransome. As Juniors, Henry James Edir, Arthur Moulton Smyth.

JUNE 21st, 1894.—The Board met at the Cataract House, Niagara Falls, N. Y., in accordance with Article VIII, Section 7, of the Constitution. Twenty-three present.

The following rules respecting the publication by the technical press of papers read before the Society were unanimously adopted:

Abstracts of papers are published in the BULLETIN in advance of the time they are to be read. Such abstracts may be published immediately, but no other publication of the papers in advance of their appearance in the *Transactions* will be permitted without the written approval of the Secretary.

The propriety of these requirements will be obvious to all. Advance copies are subject to correction and are often liable to considerable alteration.

The Society must withhold papers for publication for a reasonable time, to secure a thorough discussion; the publication of which, with a paper, greatly increase its value. Premature publication is unjust to the author and unfair to the Society.

No paper will be published in the *Transactions* which has been previously published elsewhere, and the Society owes it to itself and to its members to guarantee that originality of publications which it demands from them.

The following applicants were elected to membership: As Associates, Charles Gilman Currier, George Wilfred Pierce. As Juniors, John Whitfield Cowper, William Augustus Mopcore, Charles Tilgner.

MEMOIRS OF DECEASED MEMBERS

GILBERT MURDOCH, M. Am. Soc. C. E.*

DIED MAY 28TH, 1894.

Gilbert Murdoch was born in the town of Paisley, in Scotland, on August 12th, 1820. His paternal grandfather, John Murdoch, had been the proprietor of a spinning mill, when thread was manufactured

* Memoir prepared by William Murdoch, Esq.

in the old way. The mill building still exists, and stands on ground sacred in the eyes of all Scotsmen, being part of the original estate called Elderslie, the home of Sir William Wallace. The old oak tree (since fallen) among whose branches the "Knight of Elderslie" once found concealment from his pursuers was on the property and overshadowed the homestead of the elder Murdoch.

The advent of the Clarks and the Coatses with their improved methods of twisting thread wrought destruction and ruin among the old-style spinners, and John Murdoch had to go to the wall. His son William, having acquired the trade of a shoemaker, trained his two sons in the same calling; but Gilbert found this occupation irksome in the extreme, and though a shoemaker by stress of circumstances, he would not stick to his last.

His first escapade was into the Army, whence his father obtained his discharge; but so distasteful to him had the trade of a cordwainer become, that he would not remain at home, and we next find him in Halifax, N. S., employed in charge of pipe layers, on the gas works of that city, then being constructed. His next occupation was in a similar capacity in St. John, N. B. At this time he was about twenty-five years of age, and a devoted student of the art of gas manufacture, whose principles he mastered thoroughly, and in the course of which study he acquired several useful text books.

He also found time to become an expert stenographer, and we next hear of him upon the editorial staff of the *Morning News*, published in St. John, which city he had now made his home.

When the St. John water works were projected, Mr. Murdoch was selected by the company to take charge of the construction, his management upon the then recently completed gas works having commended him to the company. We accordingly find him in the year 1850 constructing the dam and laying the 12-in. main to the city of St. John. His life study from that date until the time of his death was water supply and the sewerage of cities and towns, and his technical library became large and exceedingly valuable.

He remained superintendent of the St. John water works after water was introduced in the city, and was continued, on the works being purchased by the community and managed by a commission.

The Commissioners' powers were enlarged in the year 1865, and the sewerage of the city entrusted to them and their superintendent. His advice was sought by outside communities, and he prepared a report to the City Council of Charlottetown, P. E. I., on water supply, besides being Consulting Engineer of the Moncton, N. B., water works.

He became a member of the American Society of Civil Engineers September 7th, 1881, an honor of which he felt justly proud, and soon afterward he joined the New England Water Works Association.

This many-sided man was a devoted meteorologist, and co-operated

with Professor Kingston, of Toronto, in establishing the Storm Signal Service in Canada, of which he was the first agent in New Brunswick. His own personal observations extend from the present day back to the year 1860. Previous to that date he had the records of another observer going back to the year 1848, thus having acquired and created an unbroken record of temperature, barometric pressure, precipitation, etc., which covers a period of 46 years.

He was stricken with pneumonia in October, 1893, and, after a three months' struggle, reappeared on the streets, bearing marks of the unequal contest. A second attack proved fatal, and he died on the 28th day of May, 1894, after an illness of but four days.

GEORGE HOWLAND, Jr., F. Am. Soc. C. E.*

DIED FEBRUARY 18TH, 1892.

George Howland, Jr., was born in New Bedford, October 20th, 1806. At the age of fifteen years he entered the business house of his father. With his father and brother Matthew he continued in business 62 years, acquiring a considerable fortune.

In 1838-40 he represented New Bedford in the Legislature; was elected a member of the School Committee in 1843; in 1845-47 he served as Selectman, being chairman of that body when the city charter was accepted in 1847. In 1853-54 he served as State Senator; in 1855 as a member of the Governor's Council; in 1855-56 as Mayor of New Bedford; and in 1861 as president of the Common Council.

In October of that year, by death of the Mayor, Mr. Howland was elected to fill the vacancy, continuing in office three years, 1862-63-64 (the years of the Civil War), filling the position with integrity and good judgment.

As an honest and able citizen, his equal is seldom seen, his ability and honesty being illustrated by the offices of trust he held and was holding at the time of his death.

He was a trustee of the New Bedford Institution for Savings for many years. A trustee and President of the Five Cents Savings Bank since its organization. From 1885 to the time of his death he was a trustee of the State Lunatic Asylum at Taunton, and a trustee of the John West estate. From 1847, with the exception of three years, he was continuously a member of the committee in charge of the Friends' Academy, Providence. He was the senior member of the Board of

* Memoir prepared by A. B. Drake, M. Am. Soc. C. E.

Trustees of Brown University, Providence, R. I., having been chosen in 1852. In 1870, under appointment of President Grant, he was one of the Commissioners to settle the difficulties between the Osage Indians and the United States. The settlement of these difficulties is a matter of history.

Mr. Howland was President of the New Bedford Port Society for 20 years—1866 to 1886. He was an associate trustee of over \$1 000 000 residuary funds under the will of Sylvia Ann Howland.

At the expiration of his first two years as Mayor, he returned his salary for those years to form a fund for the use of the public library, known as the George Howland, Jr., Fund.

Mr. Howland was ever an active member of the Society of Friends. He married Sylvia G. Allen in 1829. Mrs. Howland died about 1888.

He was a man honored and respected by all, whose energies were spent less in his own interests than in those of his fellow-men. New Bedford honors him as one of her brightest examples of public men, and a monument of personal integrity and character.

He became a Fellow of the American Society of Civil Engineers on June 6th, 1870.

ADDITIONS TO

LIBRARY AND MUSEUM.

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| From D. H. Ainsworth, Newton, Ia.:
The Railroad Question. | From Chas. W. Gay, Lynn, Mass.:
Annual Report of the City Engineer of the City of Lynn, Mass., for the year 1893. |
| From American Institute of Architects, Providence, R. I.:
Proceedings of the 27th Annual Convention, 1893. | From Lieut. J. H. Glennon, Annapolis, Md.:
Interior Ballistics. |
| From American Institute of Mining Engineers:
Artesian Well Prospects in Eastern Virginia, Maryland and Delaware
A Twelve-Mile Transmission of Power by Electricity.
The Manufacture of Open-Hearth Steel in Sweden.
Solids Falling in a Medium.
The Elk Garden and Upper Potomac Coal Fields of West Virginia.
Note on Jaw-Crushers. | From Hermann S. Hering, Baltimore, Md.:
Test of the Neversink Mountain Electric Road.
From Clemens Herschel, N. Y.:
Frontinus and His Two Books on the Water Supply of the City of Rome, A. D. 97. |
| Discussions on Bauxite: Physics of Steel; Recent Advances in Pyrometry; The Re-Working of Anthracite Culm Banks; The Determination of Phosphorus in Coal and Coke; Mine Explosions Generated by Grahamite Dust; American Blast Furnace Practice; Ore-Washer at Longdale, Virginia. | From H. V. Hinckley, Topeka, Kan.:
Proceedings of the Kansas Irrigation Association at the Wichita Convention, November 22d and 23d, 1893. |
| From Boston Public Library, Boston, Mass.:
Forty-second Annual Report of the Trustees. | From A. Huet, Hague, Netherlands:
Beraadslagingen over het Voorloopig Ontwerp eener open Verbinding van Amsterdam met de Noordzee.
Ter Nagedachtenis van Henri Francois Fijnje van Salverda.
Historisch Overzicht van de Ontwerpen tot Landaanwinning in der Zuiderzee. |
| From Dyckerhoff & Söhne, Amönburg, Germany:
Protokoll der Verhandlungen des Vereins Deutscher Portland-Cement Fabrikanten, am 23 und 24 Februar, 1894. | From Junior Engineering Society, London, Eng.:
Record of Transactions, Vol. III, 1892-93.
From J. P. Lesley, State Geologist, Philadelphia:
Atlas to Final Report Geological Survey of Pennsylvania. Maps of Schuylkill County, etc., 2 vols. |

- From Patent Office, London, Eng.:
Specifications relating to Electricity and
Magnetism Divisions I, III.
Abridgements of Specifications for Patents,
Metals, Cutting and Working.
- From A. Raddi, Spezia, Italy:
Lastricati Stradali con particolare
riguardo ai lastricati della città di
Firenze.
- From Hamilton Smith, London, Esq.:
Directors' Report El Callao Mining Com-
pany for 1893.
Horizontal Plan of Columbia Gold Mining
Company, Bolivar, Venezuela.
Plano General de las Concesiones del
Distrito Minero, Nueva Providencia.
- From U. S. Naval Observatory:
The American Ephemeris and Nautical
Almanac for the year 1897.
- From U. S. War Department, Chief of Engi-
neers:
Fourteen Specifications for the Improve-
ment of certain Rivers and Harbors.
- From University of Wisconsin:
Some Practical Hints in Dynamo Design.
Track. (Engineering Series, Vol. I, Nos.
1 and 2.)
- From University of Illinois, Urbana, Ill.:
Catalogue for 1893-94.
- Unknown:
Report of W. Bell Dawson, C. E., Survey
of Tides and Currents in Canadian
Waters.

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American Society of Civil Engineers.

PROCEEDINGS.

Vol. XX.—July, 1894.

No meetings of the Society or of the Board of Direction were held during July, 1894.

LIST OF MEMBERS.

ADDITIONS.

HONORARY MEMBER.

		Date of Membership.
GRAY, GEORGE EDWARD.....	1115 Bush St., San Fran- cisco, Cal. ..	M. July 2, 1873 Hon. M. June 5, 1894

MEMBERS.

CAMPBELL, HARRY HUSE.....	General Manager Penn- sylvania Steel Co., Steel- ton, Pa.....	June 6, 1894
CUMMING, ADELBERT EUGÈNE.....	Helena, Mont.....	June 6, 1894
DAVIES, JOHN VIPOND.....	192 Broadway, New York City.....	June 6, 1894
FRENCH, ALEXIS HENRY.....	Brookline, Mass.....	June 6, 1894
GEER, HARVEY MOSHER.....	Ballston, N. Y.....	June 6, 1894
JUDSON, CHARLES ALBERT.....	Superintendent Water Works, Sandusky, O... Jan. 3, 1894	
KAREISCHA, SERGAY DAMIANOVITCH..	Nadejdinskaia, St. Peters- burg, Russia.....	June 6, 1894
THOMAS, ARTHUR TOWNE.....	City Engineer, West Su- perior, Wis.....	June 6, 1894

ASSOCIATE MEMBERS.

DALRYMPLE, FRANCIS WHARTON.....	131 Main St., Hornells- ville, N. Y.....	Feb. 7, 1894
ROBINSON, HOLTON DUNCAN.....	342 Riverdale Ave., Yonk- ers, N. Y....	J. Mar. 1, 1892 Assoc. M. Jan. 3, 1894
WOOD, CHARLES.....	Carew Bldg., Cincinnati, O	July 4, 1894

ASSOCIATES.

		Date of Membership.
HAMLIN, CHARLES EDWARD	Chattanooga, Tenn.	Jan. 2, 1894
RANSOME, ERNEST LESLIE	269 Dearborn St., Chicago, Ill.	June 5, 1894

JUNIORS.

COWPER, JOHN WHITFIELD	Liverpool, O.	June 21, 1894
EDER, HENRY JAMES	Palmira, Cauca, Rep. of Colombia, via Panama and Buenaventura.	June 5, 1894
HURTIG, JULIUS BERNSTEIN	27 Lincoln Ave., Cincinnati, O.	Feb. 6, 1894
MONCURE, WILLIAM AUGUSTUS	Chesapeake City, Md.	June 21, 1894
SMYTH, ARTHUR MOULT	61 West 104th St., New York City	June 5, 1894
TILGNER, CHARLES	402 Hamburg Ave., Brooklyn, N. Y.	June 21, 1894
WALLACE, WILLIAM MCGEEHEE	Hotel Windsor, Washington, D. C.	April 3, 1894

CHANGES AND CORRECTIONS.

MEMBERS.

BREEN, HOWARD	1718 Williams St., Denver, Colo.
BUCHHOLZ, CHARLES W.	119 South Fourth St., Philadelphia, Pa.
DENNIS, WILLIAM F.	Lemont, Ill.
ELY, THEODORE N.	Chief of Motive Power, P. R. R., Broad St. Station, Philadelphia, Pa.
FLAGG, J. FOSTER	(Care of Brown, Shipley & Co.), Founders Court, Lothbury, E. C., London, England.
FORCE, CYRUS G.	The Livingston, Cleveland, O.
GOULD, WM. T.	Resident Engineer Texas Central R. R., Waco, Tex.
HILL, E. A.	(Care A. F. Woods' Sons), 2 Church St., New Haven, Conn.
JAQUES, WILLIAM H.	1 Broadway, New York City.
LIBBY, E. D.	Custom House, St. Louis, Mo.
LOW, EMILE	Engineer Mathieson Alkali Works, Saltville, Va.
LUCAS, D. JONES	10 North Eleventh St., Philadelphia, Pa.
NORTHRUP, H. F.	Traverse City, Mich.
PRINDLE, FRANKLIN C.	Civil Engineer U. S. N., Navy Yard, New York.
REED, H. WADSWORTH	Brunswick, Ga.
SCHMIDT, MAX E.	East Hampton, Suffolk Co., N. Y.
SMITH, S. HARRISON	331 Montgomery St., San Francisco, Cal.

STOWELL, CHARLES F.....	51 State St., Albany, N. Y.
TAYLOR, N. L.....	Box 1298, Tacoma, Wash.
THOMPSON, BENJ.....	(Care C. L. Peacock), Chattanooga, Tenn.
TOMPSON, G. M.	Engineer B. R. R. & L. R. R., 350 At- lantic Ave., Boston, Mass.
TYSON, A. H.....	Freehold, N. J.
VANCE, HART.....	Montpelier, Ind.
WAGNER, SAMUEL TOBIAS	Assistant Engineer in charge Penna. Ave. Subway, Bureau of Surveys, 415 City Hall, Philadelphia, Pa.
WATSON, WILLIAM P.....	U. S. Surveyor-General, Olympia, Wash.
WEISKOPF, SAMUEL C.	1245 Madison Ave., New York City.
WHEELER, S. S.....	Crocker Wheeler Electric Co., East Orange, N. J.
WOODBURY, CHARLES J. H.....	P. O. Box 3672, Boston, Mass.

ASSOCIATE MEMBERS.

BARNESLEY, GEORGE T.....	Bethayres, Montgomery Co., Pa.
EASBY, M. WARD	Nassau Electric R. R. Co., 43 Thirty- ninth St., Brooklyn, N. Y.
GAHAGAN, W. H.....	(Care Chief Engineer Union Pacific Ry.), Omaha, Neb.
HILL, JOHN E.....	145 Fourth Ave, Newark, N. J.
KIRKPATRICK, WALTER G.....	2102 West End Ave., Nashville, Tenn.
MATHEWSON, ISAAC	Box 25, Winfield, Mo.
MORAN, D. E.	(Care SooySmith & Co.), Mills Bldg., New York City.
THOMSON, T. KENNARD	Dominion Bridge Co., Montreal, Canada.

ASSOCIATE.

WARDER, JOHN H.	23 Roslyn Pl., Chicago, Ill.
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JUNIORS.

BELKNAP, W. E.....	87 Locust Hill Ave., Yonkers, N. Y.
BORIGHT, W. P.	Chatham, N. Y.
BYERS, M. L.....	81 W. Vermont St., Indianapolis, Ind.
COLEMAN, F. A.....	Black Rock, Ark.
CRAIG, W. R.....	N. and W. R. R., Oakvale, W. Va.
DIEBITSCH, EMILE	2014 Twelfth St., N. W., Washington, D. C.
FISH, J. C. L.	Palo Alto, Cal.
HAAS, E. F.....	Stockton, Cal.
HOWE, H. J.	Medford, Mass.
MARTIN, W. B.	Division Engineer Lexington Ave. Cable Road, 163 East 25th St., New York City.
McKENZIE, THOMAS	Gallipolis, O.

MILLER, R. P.	Crest, Va.
NICHOLS, CHARLES H.	Box 22, Branford, Conn.
SHERMAN, CHARLES W.	Kingston, Mass.
SPIELMAN, J. G.	Pittsburg Bridge Co., Pittsburg, Pa.
SWETZTER, N. B., Jr.,	234 E. Houston St., San Antonio, Tex.

RESIGNATIONS.

MEMBERS.

	Date of Resignation.
DODGE, JOSEPH T.	July 1, 1894
FINNEY, FREDERICK N.	June 28, 1894

DEATHS.

SMEDLEY, SAMUEL LIGHTFOOT	Elected Member Sept. 2, 1874; died July 21, 1894.
TRUESDELL, CHARLES	Elected Member Sept. 15, 1869; died April, 1894.

ADDITIONS TO LIBRARY AND MUSEUM.

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| <p>From Boston Public Library, Boston, Mass.:
Bulletin for July, 1894.</p> <p>From British Association for the Advancement of Science, London, Eng.:
Report for 1893, Meeting at Birmingham.</p> <p>From Cornell University, Ithaca, N. Y.:
Bulletins Nos. 66 and 67.</p> <p>From Colonel William P. Craighill, U. S. A., Baltimore, Md.:
Two Photographs of Models of Randolph's Flat Shoal.</p> <p>From C. E. Currier, M. D., N. Y.:
Gesundheit's Ingenieur, Nos. 1 to 10, for 1894.</p> <p>From German Architects and Engineers Union, Hamburg, Germany:
Hamburg und seine Bauten.
Köln und seine Bauten.
Leipzig und seine Bauten.
Berlin und seine Bauten.
Die Bauten von Dresden.
Bautechnischer Führer durch München.
Führer durch Stuttgart.
Hanover. Führer durch die Stadt und ihre Bauten.
Mittheilungen über Wiesbaden und von Mittelrhein.</p> <p>From John Purser Griffith, Dublin, Ireland:
Papers on Engineering Subjects.</p> <p>From Institute of Marine Engineers, London, Eng.:
Transactions. Vol. III. Session 1891-92.</p> <p>From Institution of Civil Engineers, London, Eng.:
Minutes of Proceedings, Vol. CXVI.</p> <p>From Massachusetts State Board of Health, Boston, Mass.:
Report of the Joint Board upon the Improvement of Charles River.</p> <p>From Michigan Mining School, Lansing, Mich.:
Report of the Directors for 1890-1892.</p> | <p>From New York State Library, Albany, N. Y.:
Regents' Report University of New York for 1893. 2 vols.
Regents' Bulletin No. 24, March, 1894.</p> <p>From Nova Scotian Institute of Science, Halifax, N. S.:
Proceedings and Transactions, Vol. I, Part 3.</p> <p>From Public Works Department, Simla, India:
Administration Report on Railways in India, 1893-94.</p> <p>From George W. Rafter, Rochester, N. Y.:
Report on the Genesee River Storage, by the State Engineer and Surveyor of the State of New York.</p> <p>From Benjamin Reece, Chicago, Ill.:
The Value of Tie Plates in Track Repairs.</p> <p>From Hamilton Smith, Jr., London, Eng.:
Report of Superintendent of Alaska Treadwell Gold Mining Company for the Year ending May 31, 1894.</p> <p>From Society of Engineers, London, Eng.:
Transactions, 1893.</p> <p>From Herbert Steward, New York:
Framed photograph of the 155th street viaduct, N. Y.</p> <p>From Superintendent of Government Printing, Calcutta, India.
General Directory and Railway List of Locomotive and Carriage Superintendents for India.
Proceedings of the Committee of Locomotive and Carriage Superintendents for India. Index, Vols. I-IV.
General and Subsidiary Rules.</p> <p>From U. S. Department of State:
Extension of Market for American Flour.
American Lumber in Foreign Markets.</p> <p>By Purchase:
Thesaurus of English Words and Phrases.</p> |
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American Society of Civil Engineers.

PROCEEDINGS.

Vol. XX.—August, 1894.

No meetings of the Society or of the Board of Direction were held during August, 1894.

MEMOIRS OF DECEASED MEMBERS.

ERNEST VICTOR CLEMENS, M. Am. Soc. C. E.*

DIED SEPTEMBER 3D, 1893.

Ernest Victor Clemens was born at Waterbury, Conn., April 3d, 1855. On March 1st, 1893, he became a member of this Society. Shortly after returning from a trip to Nevada, late in August, 1893, he was stricken with pleuro-pneumonia, and died at his residence in New York City after a brief illness. Mr. Clemens' professional accomplishments may be inferred from the following excerpt from an obituary article published in *The Iron Age*:

"At an early age he served an apprenticeship in the pattern shop, foundry and machine shop and drafting-room of the Farrel Foundry and Machine Company, at Ansonia, Conn., where he afterward became assistant superintendent. He designed and erected for them a complete sugar plant in Cuba, and he was well known among those controlling sugar plantations in that and other countries. Mr. Clemens also designed and superintended the erection of mining machinery, converters, iron, rubber, paper, brass, copper and grain rolling machinery, and general engine and mill work. At an early age he was appointed foreman of the pattern shop, and head draftsman of the Farrel works, and later he became superintendent of the National Machinery Company of Tiffin, O. Afterward he returned to the Farrel works as assistant superintendent. Prior to his connection with the De La Vergne works Mr. Clemens conducted a foundry and

* Memoir prepared by John Thomson, M. Am. Soc. C. E., and James E. Denton, M. Am. Soc. C. E.

machine shop business at Ansonia, under the style of the Clemens Foundry and Machine Company. He had been superintendent of the De La Vergne plant for five years, and to his skill and judgment are due in no small degree the development of that establishment. He designed the new erecting shop and brass foundry recently erected at these works, the general arrangement of which was shown in *The Iron Age* at the time, and commanded considerable approval. Mr. Clemens made a specialty of engines and refrigerating machinery, and at the time of his death was consulting engineer for the Central Forge Works."

An exceedingly interesting article, written by Mr. Clemens, entitled "Copper Mining in Nevada," appeared in the September, 1893, issue of "Cassier's Magazine."

The illustrations were prepared direct from photographs taken by Mr. Clemens, but the article appeared in type after his demise. He had an excellent and correct command of that most valuable adjunct to the engineer's outfit—the Queen's English—and, probably, no better index to his bright and incisive character can be presented than a few brief extracts from the posthumous article just referred to. Thus, speaking of the mineral resources of that State, he says:

"It is to the undying devotion of the prospector to his vocation that Nevada is known to fame." * * * "Prospectors are first and last Americans." * * * "If they use the product of their lead mines to execute their wholesome unwritten laws and to express their disapproval of horse stealing, they simultaneously therewith decrease the danger to posterity of inherited criminality."

And, in view of the events which have taken place within the year just past, the following had the ring of prophecy:

"The mining and working of copper ores marks the dawn of a new era in Nevada's history, and if the sequel is in keeping with initiatory experience at the new town of Clemens, silver and gold will in a few years occupy other than first place in the reports of mineral productions by the Surveyor-General of Nevada."

At the time of his death Mr. Clemens was treasurer and general manager of the White Cloud Copper Company, and the town of "Clemens," the outcome of the enterprise, was named in his honor. He was also a member of the American Society of Mechanical Engineers and of the Engineers' Club of New York City. The courtesies and delightful hospitality extended to the Society on several occasions by the De La Vergne works will be recalled by all who were privileged to attend, and with these occasions Mr. Clemens had much to do. He was a man of more than ordinary popularity, of an exceedingly bright and cheerful disposition, square as a die, and held in high esteem by all who had the honor of his acquaintance and friendship. And the sorrow of it is that in the height of life, and with hand on the door of success, the world is bereft of so delightful a personality.

BENJAMIN RHODES, M. Am. Soc. C. E.*

DIED AUGUST 12TH, 1894.

Benjamin Rhodes was born in Oswego, N. Y., February 25th, 1849, the son of Charles Rhodes, a prominent lawyer of that city. He was educated in the city schools of Oswego and at Hamilton College, Clinton, N. Y., from which latter he graduated with honors in 1871. He was valedictorian of his class and was a member of the Sigma Phi and the Phi Beta Kappa societies.

Before entering college, and also during his college course, Mr. Rhodes was at various times connected with practical engineering work, being employed in the engineering departments of the Oswego and Rome Railroad and the New York and Oswego Midland Railroad. Upon completing his college course he again took up railroad work, and was for two years Division Engineer on the Lake Ontario Shore Railroad (now part of the Rome, Watertown and Ogdensburg Railroad).

In 1874 Mr. Rhodes went to Niagara Falls, N. Y., accepting the position of Engineer and Superintendent of the New Suspension Bridge, in which capacity he served for eight years, at the same time pursuing a general engineering practice, giving particular attention to hydraulics and bridge construction. Two suspension bridges, 220-ft. span, connecting the Dufferin Islands in the Canadian Niagara Park, were constructed by him, as were several street bridges crossing the Hydraulic Power Canal in Niagara Falls. From 1875 till 1882 he was Engineer of the Niagara Falls Water Works Company, in the organization of which he took a very active part; and between 1877 and 1882, the Engineer of the Niagara Falls Hydraulic Power and Manufacturing Company. He was also instrumental in organizing the Street Railway Company of Niagara Falls, and was Engineer for the company, planning the system and constructing the first portion of the road to be built, being the line between the then villages of Niagara Falls and Suspension Bridge.

To Mr. Rhodes' efforts was due the introduction of electric lights into Niagara Falls in 1881. In that year he organized a company and built a plant for that purpose, it being one of the first electric plants erected for domestic lighting in western New York. From the time of its organization until shortly before his death Mr. Rhodes was Manager of the Brush Electric Light Company, of Niagara Falls, in which company he was a large stockholder. While connected with

this company he was a member of the National Electric Light Association.

At the annual convention of the American Society of Civil Engineers, in June, 1884, a paper by Mr. Rhodes upon "Electrical Transmission from Niagara" was read, which is of especial interest at this time, in the light of the subsequent extensive work which has been done with a view to developing and transmitting the power of Niagara Falls.

Benjamin Rhodes was an upright, honorable man in all his work and dealings; a hard, earnest worker; was highly respected by all who knew him, and was a man having a large circle of friends, among whom he counted many of the best known men of the day in his chosen profession.

He will be remembered by many of the members of the American Society of Civil Engineers who attended the late convention at Niagara Falls, as one of the active members of the Local Committee on that occasion.

Mr. Rhodes was elected a Member of the American Society of Civil Engineers April 5th, 1882. His death occurred suddenly at Toronto, while in that city on business relating to his profession.

Mr. Rhodes leaves surviving him his wife, three sons and a daughter.

LIST OF MEMBERS.

ADDITIONS.

MEMBERS.		Date of Membership.	
BIDDLE, JOHN.....	Captain Corps of Engineers, U. S. A., Nashville, Tenn.....	July 4, 1894	
BURKE, MILO DARWIN.....	41 Pike's Bldg., Cincinnati, O.....	July 4, 1894	
SAFFORD, VINTON PUTNAM.....	Superintendent Ferrocarril Mexicano del Norte, Escalon, Chihuahua, Mexico.....	July 4, 1894	

ASSOCIATE MEMBER.

EDWARDS, JAMES HARVEY.....	East Berlin, } J.	May 31, 1892
	Conn.... } Assoc. M.	May 2, 1894

ASSOCIATE.

CURRIER, CHARLES GILMAN.....	75 West 55th St., New York City.....	June 21, 1894
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JUNIOR.

LOCKWOOD, WILLARD DATUS.....6 Brighton Ave., Roches-
ter, N. Y..... April 3, 1894

CHANGES AND CORRECTIONS.

CORRESPONDING MEMBER.

PONTZEN, ERNEST.....65 rue Monceau, Paris, France.

MEMBERS.

ANDREWS, D. M.....Lincoln, Ala.
ALVORD, J. W.....5203 Hibbard Ave., Chicago, Ill.
COLE, JOHN A.....Old Colony Bldg., Chicago, Ill.
FOX, S. WATERS.....(Care Missouri River Commission), Gas-
conade, Mo.
GOULD, E. SHERMAN.....59 Hawthorne Ave., Yonkers, N. Y.
HALL, WILLIAM M.....U. S. Engineer Office, Custom House,
Cincinnati, O.
HINCKLEY, J. F.....Chief Engineer Choctaw Coal and Ry.
Co., South McAlester, Indian Ter.
KING, F. P.....Weaverville, Cal.
LANDRETH, O. H.....Union College, Schenectady, N. Y.
MACFARLANE, JAMES.....9 Silver Bow Block, Butte, Mont.
NELLES, GEORGE T.....18 Essex Bldg., Denver, Colo.
NEWHAM, CHARLES E.....605 East 140th St., New York City.
NOYES, ELLIS B.....U. S. Navy Yard, New York.
O'ROURKE, JOHN F.....53 West 85th St., New York City.
PRINDLE, FRANKLIN C.....Puget Sound Naval Station, Sydney,
Wash.
RICHARDS, H. T.....Benson, Ariz.
SAFFORD, E. S.....Sharon, Mass.
SCHMIDT, MAX E.....Princeton, N. J.
STEARNS, F. P.....Chief Engineer State Board of Health,
State House, Boston, Mass.
TOMLINSON, A. T.....226 La Salle St., Room 901, Chicago, Ill.

ASSOCIATE MEMBERS.

BROWNE, J. S.....Union Depot, Room 6, Providence, R. I.
HAWLEY, W. C.....Grafton, W. Va.
MOORE, CHARLES H.....Art Club, Philadelphia, Pa.
MORLEY, FRED.....Purdue University, Lafayette, Ind.
SHEERWOOD, GEORGE W.....227 West 2d St., Los Angeles, Cal.
SNOW, CHARLES H.....University City of New York, Fordham
Heights, New York City.

ASSOCIATE.

WARDER, JOHN H.1437 Monadnock Bldg., Chicago, Ill.

JUNIORS.

BLODGETT, JOHN.71 Park Place, Pawtucket, R. I.
 HOYT, J. T. N.109 East 45th St., New York City.
 MILLER, R. P.141 East 40th St., New York City.
 MYERS, JOHN H., Jr. Station T, New York City.
 SHERMAN, CHARLES W.1 Berkeley St., Cambridge, Mass.
 TAPPAN, ROGER.Oak Hill House, Littleton, N. H.

RESIGNATION.

Date of
Resignation.

SMITH, GEORGE C. July 20, 1894

DEATHS.

BOOKER, BERNARD FRANKElected Junior Oct. 7th, 1885; Mem-
ber June 3d, 1891; died July 21st,
1894.
 FEIND, ANTHONY ERNESTE BERNHARD...Elected Member Jan. 2d, 1890; died
August 21, 1894.
 GIBLIN, ARTHUR LEONElected Junior Jan. 31st, 1893; died
July, 1894.
 NEWELL, JOHNElected Member Jan. 29th, 1868; died
Aug. 26th, 1894.
 RHODES, BENJAMINElected Member April 5th, 1882; died
Aug. 12th, 1894.

ADDITIONS TO

LIBRARY AND MUSEUM.

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| From American Institute of Mining Engineers, N. Y.:
Transactions. Vols. XXII, XXIII, for 1893. | From Carnegie Free Library, Allegheny, Pa.:
Annual Report of the Librarian for the year ending February 28th, 1894. |
| From Chas. J. Bates, N. Y.:
Fixed or Variable Cut-Off. | From Geo. E. Gifford, Cleveland, O.:
Design of the Klug Bridge Company's New Riveting Shop. |
| From G. H. Benzenberg, Milwaukee, Wis.:
Annual Report of the City Engineer, for the year ending December 31st, 1893. | From E. W. Howe, Boston, Mass.:
Nineteenth Annual Report of the Board of Commissioners of the City of Boston, for the year ending January 31st, 1894. |
| From Board of Water Commissioners, St. Paul, Minn.:
Twelfth Annual Report for the year ending December 1st, 1893. | From Illinois Society of Engineers and Surveyors:
Ninth Annual Report, January, 1894. |
| From C. R. Boyd, Wytheville, Va.:
Map of Southwest Virginia and Contiguous Territory. | From Institution of Marine Engineers, London, Eng.:
Transactions. Vols. I, II. 1889-1890. 1890-1891. |
| From California State Mining Bureau, Sacramento, Cal.:
Methods of Mine Timbering. | |

- From Emil Kuichling, Rochester, N. Y.:
Eighteenth Annual Report of the Executive Board, Rochester, N. Y., 1894.
- From Liverpool Engineering Society, Liverpool, Eng.:
Transactions, Vol. XV.
- From Michigan Mining School, Houghton, Mich.:
Catalogue for 1892-1894.
- From Minister of Public Works, Paris, France:
Commission des Méthodes d'Essai, des Matériaux de Construction, Tome 1. Documents Généraux, 2 copies.
- From New South Wales Government Board for International Exchanges:
The Seven Colonies of Australasia, 1893.
Report of the Royal Commission on Alleged Chinese Gambling and Immorality.
Federal Government of Australasia.
The Forage Plants of Australia.
The Draft-Bill to constitute the Commonwealth of Australia.
The Year Book of Australia for 1892.
Report of Trustees of Sydney Free Public Library for 1893.
Report of the University of Sydney for 1893.
The Wealth and Progress of New South Wales, 1892.
New South Wales in 1881.
Annual Report of the Department of Mines and Agriculture for 1891, 1892, 1893.
Annual Report of the Railway Commissioners for the year ending June 30th, 1892.
Progress Report from the Select Committee on Working of Collieries, April 19th, 1894.
Official Record of the Proceedings and Debates of the National Australasian Convention, 1891.
Translation of Paper relating to the International Conference for Exchanges, held at Brussels, 1883.
- From H. V. & H. W. Poor, N. Y.:
Poor's Manual for 1894.
- From H. W. Reed, Waycross, Ga.:
Proceedings of the Tenth Annual Convention of the Roadmasters' Association of America.
- From Sanitary District of Chicago:
Proceedings, July 25th, August 1st, 8th, 1894.
- From Seismological Society, Yokohama, Japan:
Seismological Journal of Japan. Vol. III, 1894.
- From J. Herbert Shedd, Providence, R. I.:
Annual Report of the City Engineer for the year 1893.
- From Società degli Ingegneri e degli Architetti Italiani, Rome, Italy:
Annali for 1892, 1893. 3 parts of 1894.
- From Society of Naval Architects and Marine Engineers, Washington, D. C.:
Transactions, Vol. I, 1893.
- From South African Association of Engineers and Architects, Johannesburg, S. A. R.:
Second Annual Report.
- From Technical High School, Aix-la-Chapelle Germany:
Programme for 1894-95.
- From Technical High School, Berlin, Germany:
Programme for 1894-95.
- From Technical High School, Hanover, Germany:
Programme for 1894-95.
- From John C. Trautwine, Jr., Philadelphia, Pa.:
Engineer's Pocket Book, 16th edition.
- From U. S. Department of State:
Consular Reports, August, 1894.
- From U. S. War Department, Chief of Engineers:
Eleven Specifications for the Improvement of Certain Rivers and Harbors.
- From U. S. War Department, Chief of Ordnance:
Report of the Chief of Ordnance for 1893.
- From University of the State of New York, Albany, N. Y.:
State Library Bulletin, No. 2, Statistics of New York Libraries for 1893.
- From John Wiley & Sons, N. Y.:
A Text Book on Roofs and Bridges.

BOOK NOTICE.

A TEXT BOOK ON ROOFS AND BRIDGES.

Part III. Bridge Design. By Mansfield Merriman, Professor of Civil Engineering in Lehigh University, and Henry Jacoby, Associate Professor of Civil Engineering in Cornell University. 6 x 9 ins., cloth, pp. 425. John Wiley & Sons, N. Y., 1894.

The student of civil engineering or the young engineer unfamiliar, through want of experience, with the different systems employed in the various branches of his profession, can have little cause for complaint of the lack of text books. These seem to cover almost all needs. This is, perhaps, more emphatically true of those relating to the subjects treated by Professors Merriman and Jacoby in the series of books of which this is Part III.

Parts I and II were issued some time ago, and were upon Stresses in Simple Trusses, wherein the most modern practice in determining the stresses due to moving loads was given, and Graphic Statics. This volume completes the series with a sketch of the history of Bridge Design and the principles used in construction. It will be found as satisfying as those which preceded it, and will be of value, not alone to the student, but to the engineer as well. The aim of the authors, as stated in the preface, was "to present the subject both rationally, as an application of the principles of mechanics; and practically, as an illustration of modern economic structures," and a study of the work will show that the aim has been attained.

The first chapter is given to the history and literature of bridge design; refers briefly to the designs prior to 1800; the progress from 1800 to 1850; truss development since 1850, and to the various materials used in bridges. In the sections treating of progress, the different types of wooden structures in the United States are described from the Palmer bridge, combining the action of the truss and the arch in one structure, through those of Town, who introduced the lattice truss; of Howe, who, in 1840, patented a combination truss having wooden chords and web diagonals and wrought-iron vertical ties, to those of Pratt, which were at first constructed of wood, but after 1850 were of iron, and the principle of which has had extended use. The different trusses used in the United States are treated of, embracing the Bollman of 1850; the Whipple, first described in 1847 in his book, "A Work on Bridge Building," now out of print; the Warren, the Pratt and the Baltimore.

A bibliography of bridge design in this chapter enables a student to find sources of further detailed information on different types of construction.

The principles of economic design form the subject of the second chapter, whose articles cover number of piers and spans, choice of kind of bridge, theoretic comparison of trusses, economic depth and practical considerations.

Standard loads for bridges, rivet proportions, rivet spacing, pin plates, eye-bars, bridge floors, rafters and purlins, loads and stresses, end joints, chord splices, etc., are fully treated in the two succeeding chapters.

Four different designs of bridges are described in Chapter IV to VII, with full working specifications taken from actual practice, and data from personal experience.

Other chapters treat of Shop Practice, Plate, Girder and Skew Lattice Bridge; bridges constructed by the Pencoyd, Union and Phoenix Bridge Companies, and Elevated Railroad Structures.

Eighteen folding plates and illustrations in the text give interest and value to the work.

American Society of Civil Engineers.

PROCEEDINGS.

Vol. XX.—September, 1894.

MINUTES OF MEETINGS.

(Abstract of such as may be of general interest to Members.)

OF THE SOCIETY.

SEPTEMBER 5TH, 1894.—The Society met at 20 o'clock, Past President Cohen in the chair; F. Collingwood, Secretary, and present, also, 58 Members and 12 visitors.

The election by the Board of Direction of two Associates and five Juniors was announced.

The following deaths were announced: Bernard Frank Booker, elected Junior October 7th, 1885; Member June 3d, 1891; died July 21st, 1894. Anthony Ernest Bernhard Feind, elected Member January 2d, 1890; died August 21st, 1894. Arthur Leon Giblin, elected Junior January 31st, 1893; died August 26th, 1894. Benjamin Rhodes, elected Member April 5th, 1882; died August 12th, 1894. Samuel Lightfoot Smedley, elected Member September 2d, 1874; died July 21st, 1894. Charles Truesdell, elected Member September 15th, 1869; died April, 1894.

The following letters were read by order of the Board of Direction:

SOCIÉTÉ DES INGÉNIEURS CIVILS DE FRANCE,
10 CITÉ ROUGE-MONT,
PARIS, May 31st, 1894.

To the President of the American Society of Civil Engineers:

SIR,—We have the honor to send you, in the name of our colleagues, the vote of thanks passed by our Society.

The *Société des Ingénieurs Civils de France*, in general assembly, votes by acclamation thanks to all the engineers and associations of engineers of the United States for the hearty and friendly manner with which its delegates were received during their journey in America.

We would have written on this subject sooner, but we wished to send at the same time a souvenir of our visit; this will reach you by the same mail. The preparation, which required some time, is the reason of the delay which has occurred in sending you our official thanks. We beg you to be kind enough, at one of your coming meetings, to present these thanks to your colleagues with whom our delegates had the pleasure of forming acquaintance, and whom we hope to receive, in our turn, in France.

Accept, Mr. President, the assurance of our most friendly and distinguished consideration.

DU BOSQUET, *President*;
L. REY, *Chairman*;
A. DE DAX, *General Secretary*;
L. DE CHASSELOUP LOUBAT, *Special Delegate*.

PARIS, June 15th, 1894.

To the President of the American Society of Civil Engineers:

SIR,—I have the honor to send to you by this mail—

1st. A roll containing the official letter of thanks addressed to your committee by our delegates.

2d. A roll containing a certain number of souvenirs of our journey (10 copies).

3d. A box containing a certain number of medals struck on the occasion of the same journey (10 medals).

We beg you to accept these; one for the Society, one for the President and one for the Secretary; the remainder for those of your colleagues who took a special part in the friendly reception extended to us last year.

Accept, dear sir, the expression of my distinguished consideration.

A. DE DAX,
Secretary-General.

The following resolution was offered by Thomas C. Clarke, M. Am. Soc. C. E., and was duly seconded :

"Resolved, That a committee be appointed to report to the Society whether it seems practicable for the Society to recommend to its members the adoption of a uniform scale of fees or commissions, to be charged when payment of salary does not necessarily apply."

Under the provision of Article VI, Section 13, of the Constitution, the above resolution was declared lost, as it did not receive the affirmative vote of 25 Corporate Members.

A paper on "Some Notes on Hot-Bath Tests for Cement," by Messrs. Frederick H. Lewis and J. Edward Whitfield, was read by the Secretary. Written discussions were also presented from Messrs. Wm. H. Booth, M. J. Butler and L. C. Sabin, and the subject was orally discussed by Messrs. R. W. Leslie and T. D. Whitaker.

SEPTEMBER 19TH, 1894.—The Society met at 20 o'clock, Director Bernard R. Green in the chair; F. Collingwood, Secretary, and present, also, 28 Members and 1 visitor.

A paper by Bolton W. De Courcy on "Improvement of Gray's Harbor, Washington," was read by the Secretary.

OF THE BOARD OF DIRECTION.

SEPTEMBER 4TH, 1894.—Ten Members present.

The President announced the appointment of a committee to report on the proposed amendments to the Constitution as follows :

Samuel Whinery, Chairman; Clemens Herschel, C. L. Strobel, Wm. H. Bixby, Wm. Metcalf, B. R. Green and John Thomson.

The following resolution was adopted :

"Whereas, The Board of Direction of the American Society of Civil Engineers desires to give expression to the appreciation of the Society for the kindness with which its Members were received and entertained on June 25th, 1894; be it therefore

"Resolved, That the thanks of the American Society of Civil Engineers are hereby heartily tendered to His Worship the Mayor and the Members of the Council of the City of Toronto, Canada, for the kindness and courtesy shown to the Society as a body and to its members individually on the occasion of its visit to that beautiful city."

Letters from the officers of the Société des Ingénieurs Civils de France, transmitting thanks of that Society for courtesies received last year and medals and souvenirs of their visit were read and were ordered presented at the next meeting of the Society.

Applications were considered and other routine business transacted.

MEMOIRS OF DECEASED MEMBERS.

ARTHUR LEON GIBLIN, Jun. Am. Soc. C. E.*

DIED JULY 17TH, 1894.

Arthur L. Giblin, son of James De Soto and Harriet E. D. Connell Giblin, was born at Troy, N. Y., November 8th, 1866. After completing the course at the Troy High School he entered the Rensselaer Polytechnic Institute and graduated in 1891 with the degree of Civil Engineer. While pursuing his studies at the Institute, and during the vacations, he obtained practical experience in office and field work, having been employed as draftsman at Watervliet Arsenal, and by the Cohoes Machine and Iron Company, and as assistant to the City Engineer of Amsterdam, N. Y. After graduating, he took charge of a surveying party for the Public Improvements Commission of Troy, resigning this position in October, 1892, to become assistant to the Professor of Engineering at the Lawrence Scientific School of Harvard University.

* Memoir prepared by Palmer C. Ricketts, M. Am. Soc. C. E.

In 1894, the authorities of the University recognized his ability and worth by appointing him Instructor in Civil Engineering. In this position he had charge of the courses in Rational Mechanics, Bridges and other structures.

He was a young man of fine character, with indomitable courage and great energy and capacity for work. Few men in the profession have, at such an early age, left behind them such a record.

Mr. Giblin was elected a Junior Member of the American Society of Civil Engineers on January 31st, 1893.

JOHN NEWELL, M. Am. Soc. C. E.*

DIED AUGUST 26TH, 1894.

John Newell was born at West Newbury, Essex County, Mass., March 31st, 1830. Member of the American Society of Civil Engineers January 29th, 1868. Died in Youngstown, O., suddenly, August 26th, 1894.

The details of his engineering life are as follows: 1846, he entered railroad service as a rodman on the Cheshire Railroad in New Hampshire; 1847 to 1850, Assistant Engineer on Vermont Central Railroad, and in charge of the completion of the terminal at Burlington; 1851, Assistant Engineer upon the extension of the Champlain and St. Lawrence Railroad from near La Prairie to Montreal; 1852, surveyed the route for a railroad between Louisville and Cincinnati; 1854, surveyed a route for a railroad from Saratoga to Sackett's Harbor; 1856, Engineer of the old Cairo City Road; 1856 to 1863, Engineer of Maintenance of Way of the Illinois Central Railway; 1863 to 1865, Superintendent of Construction of the Winona and St. Peter Railroad; 1865 to 1868, President of Cleveland and Toledo Railroad; 1868 to 1869, Engineer and Superintendent of the New York Central and Hudson River Railroad; 1869 to 1871, Vice-President Illinois Central Railroad; 1871 to 1874, President Illinois Central Railroad; 1875 to 1883, General Manager Lake Shore and Michigan Southern Railway; 1883 to 1894, President and General Manager of this road, also President of the Pittsburgh and Lake Erie Railroad, and of several other corporations allied with the Lake Shore Company.

This simple statement of the responsible offices which he filled marks Mr. Newell as one of the most important and conspicuous of the railroad men of his time. During his whole life he was distinguished by an entire devotion to his employment, by unusual powers of observation, excellent judgment, unwavering determination, great energy and ceaseless activity. He planned and executed the extensive im-

* Memoir prepared by Charles Paine, Past President Am. Soc. C. E.

provements in the alignment and grades of the Lake Shore and Michigan Southern and of the Pittsburgh and Lake Erie railways, paying for the work out of surplus earnings, an achievement which entitles him to a high rank as a constructing engineer.

As an operating officer in control of large bodies of subordinates, and as a business manager in competition with others, Mr. Newell was at least the peer of any contemporary.

His influence upon the general railroad policy was acknowledged by all, and his untimely death deplored with expressions of the highest esteem and of sincere regret.

He was an honest man, a good friend and a valuable citizen. Mr. Newell married, in 1857, Judith P. Hills, who, with two sons and two daughters, survives.

Since 1869 his home had been in Chicago, Ill.

LIST OF MEMBERS.

ADDITIONS.

MEMBER.	Date of Membership.
CARR, WALTER FRANK.....General Manager Roanoke Street Ry., Roanoke, Va.....	June 6, 1894

ASSOCIATE MEMBER.

POULSTON, ARTHUR EDWIN.....Ravenna, O.....	April 4, 1894
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CHANGES AND CORRECTIONS.

MEMBER.

PICKETT, WILLIAM D.....	Wise, Wyo.
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ASSOCIATE MEMBERS.

DAVIS, ARTHUR P.....	U. S. Geological Survey, Denver, Colo.
DEWEY, EDWARD W.....	Hohethor Promenade 4, Braunschweig, Germany.
HILL, JOHN E.....	19 Angell St., Providence, R. I.
HOUSTON, J. J. L.....	1107 Monadnock Bldg., Chicago, Ill.
SHERWOOD, G. W.....	123 S. Broadway, Los Angeles, Cal.
TOWSON, M. S.....	51 Quincy St., Cleveland, O.

ASSOCIATE.

HANDY, FRANK W.....	Teutonic Bldg., Chicago, Ill.
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JUNIORS.

BORIGHT, WM. P.....	60 East Buffalo St., Ithaca, N. Y.
HURTIG, J. B.....	King Bridge Co, Cleveland, O.
SHALER, IRA A.....	22 William St., New York City.
SHERMAN, CHARLES W.....	60 East Buffalo St., Ithaca, N. Y.
YOUNG, H. A.....	Revere, Mass.

ADDITIONS TO LIBRARY AND MUSEUM.

- From Association of Engineers and Architects of Mexico, Mexico:
Annals, Vols. I, II; 12 parts, Vol. III.
- From American Institute of Mining Engineers:
Close Sizing before Jigging.
Magnesia and Sulphur in Blast Furnace Cinder.
A Uniform Method for the Assay of Copper Materials for Gold and Silver.
The Geological Structure of the Ringwood Iron Mines, N. J.
Alunogen and Bauxite of New Mexico.
Aluminum Bronze.
The Inaccuracy of the Commercial Assay for Silver and of Metallurgical Statistics in Silver Mills.
Notes on the Structure of the Franklinite and Zinc-Ore Beds of Sussex Co., N. J.
Does the Vibration of Stamp-Stems Change their Molecular Structure?
The Ore Deposits of Butte City.
The Structure of the Richmond Coal Basin.
The Manganese Slags of Tombstone, Arizona.
Ore-Dressing and Concentration in Sweden.
Note on the Taylor Gas-Producer Plant at the Ontario Mill.
Discussions on Some Experiments for Determining the Refractoriness of Fire Clays; The Genesis of Ore Deposits; a Twelve-Mile Transmission of Power by Electricity; The Limitations of the Gold Stamp Mill.
- From American Iron and Steel Association, Phila.:
Statistics of the American and Foreign Iron Trades for 1890, 1892, 1893.
- From Babcock & Wilcox Co., N. Y.:
Steam. 2 copies (English and German).
- From California State Mining Bureau:
The Gas and Petroleum Yielding Formations of the Central Valley of California.
- From Mendes Cohen, Baltimore, Md.:
Report on Car Fenders suitable for Use on Street Railways.
- From Engineering Association of the South, Nashville, Tenn.:
Papers read. Vol. VI, August, 1894.
- From E. Sherman Gould, Yonkers, N. Y.:
Practical Hydraulic Formulas for the Distribution of Water through Long Pipes.
- From H. V. Hinckley, Topeka, Kansas:
Kansas at the World's Fair.
- From Institution of Civil Engineers, London, Eng.:
Minutes of Proceedings, Vol. CXVII.
List of Members, September 6th, 1894.
- From Institution of Mechanical Engineers, London, Eng.:
Proceedings, April, 1894.
- From Iron and Steel Institute, London, Eng.:
Journal, Vol. XV, No. 1, 1894.
Rules and List of Members.
- From Franz Kreuter, Munich, Germany:
Berechnung der Staumauern.
- From McGill College and University, Montreal, Can.:
Annual Calendar with Examination Papers for Session 1893-94.
- From Master Car-Builders' Association, Chicago, Ill.:
Report of Proceedings, 1894.
- From Daniel W. Mead, Rockford, Ill.:
The Hydro-Geology of the Upper Mississippi Valley and of some of the Adjoining Territory.
- From Michigan Mining School, Houghton, Mich.:
Catalogue, 1892-94.
- From Royal Society of Canada:
Proceedings and Transactions, Vol. XI.
- From Sanitary District of Chicago:
Proceedings, August 15th, 22d, 29th, September 5th.
- From Smithsonian Institution, Washington, D. C.:
Annual Report to July, 1893.
- From Smithsonian Institution, U. S. National Museum:
Reports for 1892-93.
- From U. S. Department of State:
Consular Reports, September, 1894.
- From U. S. Geological Survey:
Vols. XX, XXI, XXII.
Bulletins Nos. 97 to 117 inclusive.
Mineral Resources of the United States, 1892, 1893.
Thirteenth Annual Report. Parts 1-3.
- From U. S. Treasury Department, Bureau of Statistics:
Summary Statement of the Imports and Exports of the United States for July 1894.
- From U. S. War Department, Chief of Engineers:
Thirty-eight Specifications for the Improvement of certain Rivers and Harbors.
Twelve Reports on the Improvement of certain Rivers and Harbors.

American Society of Civil Engineers.

PROCEEDINGS.

Vol. XX.—October, 1894.

MINUTES OF MEETINGS.

(Abstract of such as may be of general interest to Members.)

OF THE SOCIETY.

OCTOBER 3D, 1894.—The Society met at 20 o'clock, President Craig-hill in the chair; F. Collingwood, Secretary, and present, also, 84 Members and 8 visitors. Ballots were canvassed and the following candidates declared elected. As Members: Andrew Chase Cunningham, Wayne, Pa. (elected Assoc. M. Am. Soc. C. E., September 2d, 1891); Charles Hansel, Chicago, Ill.; Harry Seymour Hodge, Detroit, Mich.; Henry Arthur La Chicotte, New York City; Joseph Mayer, Buffalo, N. Y.; James Suydam Polhemus, Empire City, Mo.; William Galt Raymond, Troy, N. Y.; John Ruddle, Mauch Chunk, Pa.; Sumner Farnham Shaw, San Francisco, Cal.; Carl Alfred Sundstrom, Philadelphia, Pa.; Thomas William Symons, Portland, Ore.; Hubert Primus Taussig, St. Louis, Mo.; Ashley Bemis Tower, Holyoke, Mass. As Associate Members: Benjamin Wilder Guppy, Boston, Mass. (elected Junior, June 19th, 1891); William Johnson Harahan, Kankakee, Ill.; James Hugh Stanwood, Boston, Mass.; John Lane Van Ornum, St. Louis, Mo.

Ballots were canvassed on Amendments to the Constitution with the following result.

ARTICLE II.

SECTION 1. Strike out the words "*and Subscribers*" in the third line of the section, and insert the word "*and*" before "*Fellows*."

SECTION 9. Strike out this section altogether.

ARTICLE III.

SECTION 6. Strike out the words "*or Subscriber*" in the first line of section, and insert the word "*or*" before "*Fellow.*"

SECTION 7. Strike out the words "*or Subscribers*" in the third line of section, and insert the word "*or*" before "*Fellows.*"

ARTICLE IV.

SECTION 1. Strike out the words "*Subscribers, ten dollars.*"

SECTION 2. Strike out the words "*and Subscribers, ten dollars.*"

SECTION 3. Strike out the words "*and Subscribers,*" and make it read "*Associates, five dollars; Juniors, five dollars.*"

SECTION 7. Strike out the words "*or Subscriber*" in the second, third and fifth lines, and insert the word "*or*" before "*Associates*" in the fifth line. Strike out the words "*or Subscribers*" in the eighth line, and insert the word "*or*" before "*Associates*" in the same line. Strike out, also, "*or Subscriber*" in the eleventh line and the same words in the twelfth line.

Ballots cast, 204; affirmative, 194; negative, 5; blank, 5.

ARTICLE II.

SECTION 8. Strike out the word "*who*" in the second line of the section and insert the words "*though they*" before the word "*may.*"

Ballots cast, 204; affirmative, 196; negative, 3; blank, 5.

ARTICLE III.

SECTION 1. Strike out all of the first sentence after the word "*Direction*" in the second line, and insert the word "*only*" after the word "*elected*" in the second line.

Ballots cast, 204; affirmative, 196; negative, 5; blank, 3.

ARTICLE III.

SECTION 2. Strike out all of the first paragraph after the words "*applicant shall*" in the eighth line of the section, and insert "*furnish the names of at least five Corporate Members to whom he is personally known. Each of these shall be requested by the Secretary to address a letter to the Board of Direction, on a form prescribed by said Board, stating the extent of the writer's personal knowledge of the applicant and of his professional work. If at least five of the Corporate Members named as references do not furnish the requisite endorsement, the Secretary shall call upon the applicant for additional names, and not until written communications shall have been received from at least five Corporate Members shall the application be considered by the Board.*"

Ballots cast, 204; affirmative, 193; negative, 7; blank, 4.

ARTICLE III.

SECTION 2. Insert the word "~~for~~" after the word "by" in the sixteenth line.

Ballots cast, 204; affirmative, 193; negative, 7; blank, 4.

ARTICLE VI.

SECTION 4. Insert as an entirely new paragraph at the beginning of the section, as follows:

"The Secretary shall be a Corporate Member of the Society. He shall be elected annually by the Board of Direction at the meeting to be held within twenty days after the Annual Meeting provided for in Section 8 of Article VI, or at an adjournment thereof, and shall hold the office for one year, or until his successor is elected, provided that a majority of the whole Board of Direction shall be required to elect the Secretary; this vote to be given, if necessary, by letter."

Strike out the words "*The Secretary*" in the first line of the section and insert the word "*He*."

Ballots cast, 204; affirmative, 191; negative, 6; blank, 7.

ARTICLE VII.

SECTION 1. Insert the following:

"The Secretary shall be elected in accordance with the provisions of Article VI, Section 4."

Ballots cast, 204; affirmative, 177; negative, 25; blank, 2.

All of the above amendments having received an affirmative vote of two-thirds of all ballots cast, were declared adopted.

Announcement was made of the election by the Board of 10 Juniors.

The report of the Nominating Committee was presented.

The final report of the Committee on Badges, which had been adopted by the Board of Direction, was read.

A paper by O. F. Nichols, M. Am. Soc. C. E., on "The Myrtle Avenue Improvement of the Brooklyn Elevated Railroad," was read by the author. Written discussions from John Thomson, M. Am. Soc. C. E., and E. E. R. Tratman, Assoc. M. Am. Soc. C. E., were presented and read by the Secretary. The subject was further discussed by Messrs. Croes, H. W. Brinckerhoff, Leverich, Gould, Bogue, Brendlinger, Blakeley, and the author.

OCTOBER 17TH, 1894.—The Society met at 20 o'clock, Vice-President Macdonald in the chair; F. Collingwood, Secretary, and present, also, 70 Members, and 10 visitors.

The death of Capt. Philip M. Price, elected Member May 2d, 1888; died October 4th, 1894, was announced.

A paper by E. Sherman Gould, M. Am. Soc. C. E., on "The Dunning's Dam, near Scranton, Pa.," was read by the author, and discussed by Messrs. Macdonald, Worthen, Hutton, W. H. Baldwin, Kenneth Allen, James Owen, Crowell, Lesley, Collingwood and the author.

OF THE BOARD OF DIRECTION.

OCTOBER 2D, 1894.—Eleven Members present.

The following report from the Nominating Committee was presented.

OCTOBER 1ST, 1894.

To the Board of Direction of the American Society of Civil Engineers:

The Nominating Committee appointed at the Business Meeting of the Annual Convention of the Society, held at Niagara Falls, June 20th-25th, 1894, herewith presents a list of nominations for the offices to be filled at the next Annual Election, as required of it by Art. VII, Sec. 1, of the Constitution of the Society.

To wit:

For President.—George S. Morison.

For Vice-Presidents.—Desmond FitzGerald, Benjamin M. Harrod.

For Secretary.—Othniel F. Nichols.

For Treasurer.—John Thomson.

For Directors.—Charles SooySmith, Augustus Mordecai, Robert Cartwright, Fayette S. Curtis, George H. Brown, George H. Benzenberg.

The Committee begs to add, for the information of the Board of Direction, that all the Members nominated have accepted their nominations.

Respectfully submitted by direction of the Nominating Committee.

CLEMENS HERSCHEL,
Chairman.

A report was received from the Committee on Badges, making the following recommendations:

First.—That badges be issued only to Corporate Members, Associates and Fellows, for the reason that Juniors, being only probationary members retiring at thirty years of age unless advanced to another grade, are not entitled to receive them.

Second.—That badges be issued hereafter in two colors—blue enamel for Corporate Members, and maroon for Associates and Fellows.

Third.—That each member receiving a badge be required to sign an agreement to return it to the Society, receiving a credit equal to its intrinsic value, should his connection with the Society cease from any

cause other than death, and waiving his right to resignation until such return.

Fourth.—That the future issue of certificates of membership should be made under a similar agreement.

Fifth.—That badges be issued by the makers, Messrs. Tiffany & Co., under order of the Secretary of the Society, so that no duplication will be possible.

Sixth.—That engravings of the badge be made for use on the cover of *Transactions*, and on the stationery of the Society.

Seventh.—That a circular be sent out for the information of the membership, giving briefly the reasons leading to the adoption of the present design, with *fac-simile* imprints in colors.

Eighth.—That at the general meetings of the Society ribbon badges be provided in colors, as follows: Blue for Corporate Members; maroon for Associates and Fellows; and white for Juniors, and red for guests.

The report was accepted and its recommendations adopted.

The President was authorized to appoint Committees for the Award of the Norman Medal and Rowland Prize.

The resignation of Reuben Miller, M. Am. Soc. C. E., was presented and accepted.

The following candidates were elected Juniors: Alfred Pancoast Boller, Jr., Thomas Amory Coffin, Benjamin LeFevre Coulson, Albert Worthington Hankinson, George William Behrman, Frederic Harold Fay, Curtis Grubb Hussey, Henry Matson Waite, Samuel Walter Williams, Peyton Brown Winfree.

Applications were considered and other routine business transacted.

MEMOIRS OF DECEASED MEMBERS.

ALLAN CAMPBELL, Hon. M. Am. Soc. C. E.*

DIED MARCH 18TH, 1894.

Allan Campbell was the fourth son of Archibald Campbell, who was for many years Deputy Secretary of the State of New York, a native of Scotland, who came to this country in the year 1798.

Allan was born on the 11th day of October, 1815, in the city of Albany. He was educated at the Albany Academy. In the year 1832

* Memoir prepared by Col. John Campbell, U. S. A.

he joined John Randall, a distinguished engineer of that time, who was the Chief Engineer of the Ithaca and Owego Railroad, one of the first railroads in the United States.

He was afterwards employed by the citizens of Albany in making a survey of a "direct route" for the Erie Canal, from Schenectady to Albany. The survey and the report thereon were greatly admired and praised.

In 1846 he was an Assistant of Wm. J. McAlpine, on the enlargement of the Erie Canal at the southerly end.

Having accepted a position as Engineer in the construction of the earliest railways in the State of Georgia, he served there several years. While on this duty he met Miss Julia Fairlie Cooper, daughter of Thomas Cooper, the tragedian, whom he married in 1843.

He was subsequently employed for several years under Col. Long, U. S. Eng. Corps, on the improvement of the Ohio River, being stationed at Cincinnati and Louisville.

In 1847, he was Chief Engineer of the Extension of the Harlem Railroad. While so employed he had an offer from the government of Chili to go to that country and construct railroads. He accepted, and went thither in January, 1850, taking with him his brother Alexander, the late Walton W. Evans, and other assistants.

His first work in Chili was the survey and construction of the Copiapo and Caldera Railway, a most successful and profitable road.

He was then engaged by the Chilean government to survey a route for a railway from Valparaiso to Santiago. He found a very satisfactory route for this road; but conflicting interests appearing among the officers of the government, an English engineer was employed, who adopted a new line, and built the road at a cost far beyond the estimates of Mr. Campbell.

Twice Mr. Campbell crossed the Andes to the Argentine Republic, making reconnoissance of a railway route to connect the two oceans. While in Buenos Ayres he was in intimate and most friendly relation with the then President of Argentina.

In 1856 Mr. Campbell sailed from Buenos Ayres and returned to the United States and his native city, Albany.

Soon after his return he became again Chief Engineer of the Extension of the Harlem Road, and, subsequently, President of that road. This he held until superseded by Cornelius Vanderbilt, who had purchased a controlling interest in the road.

Subsequently Mr. Campbell was offered and accepted the Presidency of the Consolidation Coal Company, of Maryland, which he brought out of financial difficulties and made a dividend-paying company. This it continued to be until adverse legislation by the Maryland legislature destroyed its acquired value. Mr. Campbell then left the company.

In 1876, Mr. Campbell was appointed by Mayor Wickham, of New York, Commissioner of Public Works, which he held for several years, and managed with his usual regard for the interest of his employers.

This position he vacated in 1880, to accept the Comptrollership of the city, to which he was appointed by Mayor Edward Cooper. Here, as in his preceding office, he worked with a single eye to the welfare of the city. It is demonstrable that in these two offices he saved the city millions of money.

In 1880 Mr. Campbell was appointed by act of legislature one of the Assessment Commissioners. To this commission was referred, as to a court of final jurisdiction, the many suits instituted against the city of New York for rebates of assessments levied for public improvements. The labors of the Commissioners did not end until December 31st, 1886. Their work was a great relief to the overcrowded court calendars, and brought to a speedy but equitable conclusion a very large number of causes that otherwise would have dragged on for many years through the regular but sluggish channels of the established courts.

Mr. Campbell was also a member of the commission appointed by the Legislature to supervise the change of grade on the New York and Harlem Railroad through the city, generally known as the Fourth Avenue Improvement.

In the year 1882 his name was prominently mentioned as a candidate for the Governorship of the State, and in the same year he was nominated as a non-partisan candidate for the mayoralty of the city. The honesty, the intelligence and the wealth of the city, as is usually the case, failed to turn out at the polls, and Mr. Campbell was defeated.

In 1883, owing to ill health, Mr. Campbell resigned the Comptrollership of the city. After this he remained in quiet retirement at his residence in the city of New York, enjoying the modest competency which he had acquired by a long life of industry and conscientious application to the duties of the positions he held. His strict integrity and his conscientious scruples against meanness and the remotest approach to dishonest practices stood in the way of his accumulating great riches. More than one opportunity presented itself in his business career when by availing himself of his official information he might have made immense sums. But never for a moment was he tempted by such opportunities.

During the later years of his life he took great interest in the Leake & Watts Orphan Asylum, of which he was a trustee by virtue of his office of Warden in the Trinity Vestry. He gave much of his time to the selection of the site now occupied by the asylum on the Hudson River, just north of the city's boundary line, frequently visiting the buildings while in course of construction, and, through his experience and advice, doing much to secure their present fitness for asylum purposes.

During the early part of the war he was a prominent member of the commission appointed by the Government to look after the defences of the city. At a later date he was in correspondence with the British Minister in Washington, affording information and advice in reference to the construction of railways in India.

Mr. Campbell was a member of the New York Historical Society, the Geographical Society, the St. Andrews Society, the Century Club, and was for many years a Vestryman of Trinity Church, succeeding John Jacob Astor as Warden in that organization.

Mr. Campbell had reached the mature age of 78, was in the enjoyment of unimpaired bodily vigor and the full possession of his mental faculties, enjoying the *Otium cum dignitate* which a well-spent life and a conscience void of offence had entitled him to, when on the 27th of February, 1894, he was attacked with an illness which terminated in his death on the 18th day of March. He lies buried in Greenwood Cemetery by the side of his dearly beloved wife and his only son, Thomas Cooper Campbell.

Mr. Campbell became a Member of the American Society of Civil Engineers February 19th, 1868, and was elected an Honorary Member March 1st, 1892.

BERNHARD FEIND, M. Am. Soc. C. E.*

DIED AUGUST 21ST, 1894.

Anthony Ernest Bernhardt Feind was born May 3d, 1849, and received his earlier education in Hildesheim, Germany, where he graduated from the "Gymnasium Josephinum" in 1866, after which he attended the Technical High School in Hanover, from which he graduated in 1870. From this time and until 1878 he was engaged in connection with various engineering enterprises in Germany; the last four years of the above-mentioned period he served as chief of a section (*Sectionbaumeister*) under the government in making the surveys for, and in the construction of, a new line for the Royal Westphalia Railway Company in a mountainous country. This position he left to enter the Prussian army as a "one-year volunteer," after which, thinking to enter the Government Engineering Service of Prussia, he re-entered the Technical High School of Hanover and Berlin and took a post-graduate course. He gave up, however, the idea of entering the government service, and in 1880 emigrated to the United States, where for four years he was engaged in pursuits not connected with engineering.

* Memoir prepared by Samuel G. Artinngstall, M. Am. Soc. C. E.; John Lundie, M. Am. Soc. C. E., and John A. Cole, M. Am. Soc. C. E.

In 1884 he was engaged in the service of the United States Government as topographical assistant on the Hennepin Canal. In the fall of 1885 he was engaged by the city of Chicago on the preliminary survey of the Desplaines River from Summit to Joliet, and in this connection was retained by the Drainage and Water Supply Commission, then appointed by the city of Chicago until December, 1886, when he was appointed Resident Engineer in charge of the extension of the city water supply in the building of new tunnels and appurtenances.

In August, 1889, Mr. Feind was entrusted by Mayor DeWitt C. Cregier with the duty of working up data to be used in arguing the question of boundaries for the proposed Sanitary District of Chicago before the three Judges of Cook County sitting to determine such boundaries. On the completion of this work he was appointed to the office of Assistant City Engineer, with special charge of the water-supply system, which office Mr. Feind held until July, 1892, when he resigned to go into business for himself. In this connection he for some time acted in the capacity of engineer in charge of water supply for the World's Columbian Exposition, and, in January, 1893, he was engaged by City Engineer Dion Geraldine as Consulting Engineer for the city, in which capacity he continued to act until May of the same year.

Shortly before his death Mr. Feind had secured a position on the Sanitary District Canal, but through illness he had not commenced work.

He died August 21st, 1894, leaving a wife and four children, the oldest being but eight years old.

Mr. Feind became a member of the American Society of Civil Engineers January 2d, 1890; he was also a member of the Western Society of Engineers, and had contributed several articles of interest to scientific publications.

BERNARD FRANK BOOKER, M. Am. Soc. C. E.*

DIED JULY 21ST, 1894.

Bernard Frank Booker was born in Buffalo, N. Y., August 22d, 1858. At the age of nine years he was taken to Europe, and there remained until the age of seventeen, studying at Berlin, Germany, and at Berne, Switzerland. Returning to America, he entered the Polytechnic Institute at Worcester, Mass., and graduated in July, 1877.

The following year he entered the Engineering Department of the Atchison, Topeka and Santa Fé Railroad Company, his first position being that of head chainman on location in New Mexico. Until 1882, he was engaged on Surveys and Construction, both in New Mexico and

* Memoir prepared by James Dun, M. Am. Soc. C. E.

Kansas, the close of 1881 finding him engaged as Assistant Engineer in charge of a 10-mile division under construction.

Soon after the Santa Fé completed its connection at Deming with the Southern Pacific Railroad, thus opening the second of the great transcontinental lines, Mr. Booker was sent to Arizona to assist in the location and construction of the New Mexico and Arizona Railroad. In 1883, Mr. Booker left the service of the Santa Fé, going into Old Mexico, where he was engaged on the Tampico Branch of the Mexican Central Railway. Returning to the United States, he took employment for a brief time with the American Express Company, with which company his father has long held an important official position.

In 1885, he took charge of a locating party in the mountains west of Denver, Colo., for the Burlington and Missouri River Railroad Company, and upon the completion of the surveys became Resident Engineer on the Chicago, Burlington and Northern. Upon the completion of that road, in the spring of 1886, he again entered the service of the Santa Fé, and was engaged first on surveys in Missouri for the proposed Chicago extension, and later as Assistant Chief Engineer in charge of construction between the junction with the Kansas City Belt Railroad, at Big Blue Junction, to the crossing of the Des Moines River (known as the C. S. F. & C. Railway Company of Iowa), a distance of 195 miles. It was upon this work that Mr. Booker demonstrated his engineering and executive skill and ability, and proved that his selection by Mr. A. A. Robinson, the Chief Engineer, for this responsible position was, indeed, a happy one. Construction was begun in March, 1887, and before the close of that year the track was laid.

The years 1886 and 1887 will be ever memorable on account of the rapid construction of railroads in the West; but of all the great work then done, none surpassed the rapidity and thoroughness with which the Santa Fé pushed forward its line from the Missouri River to Chicago. He remained in charge in Missouri until October, 1888, when he was transferred to Texas, and placed in charge of maintenance of way of the entire Gulf, Colorado and Santa Fé system. The climate of Texas not agreeing with him, he, at his own request, was relieved, making his headquarters at Topeka. Until December, 1893, he was engaged on surveys in the Indian Territory and New Mexico, having charge of the construction of the Cerrillos Coal Railroad from Waldo Station to the Anthracite Coal Fields of New Mexico, and as Resident Engineer of the Chicago Division.

In December, 1893, owing to failing health, he resigned service with the Santa Fé. Hoping that a change to a milder climate would prove beneficial, he went to the city of Mexico, taking a responsible position with the Mexico, Cuernavaca and Pacific Railroad. Finding he was growing steadily worse, he returned to the United States and died at Virginia City, Nev., Saturday, July 21st, 1894. Mr. Booker was mar-

ried September 11th, 1882, at Virginia City, to Miss Mary Steffan, who survives him. Four children were born to them, three of whom are still living.

Mr. Booker was a gentleman, a scholar, and, as his life's work shows, an engineer of proved ability. He was devoted to his chosen profession, of unquestioned integrity, and so uniformly considerate and kind that he made lasting friends of all with whom he was brought in contact, either professionally or socially.

Mr. Booker was elected a Junior of the American Society of Civil Engineers, October 7th, 1885, and transferred to the grade of Member, June 2d, 1891.

LIST OF MEMBERS.

ADDITIONS.

MEMBERS.		Date of Membership
CUNNINGHAM, ANDREW CHASE.....	Wayne, Pa. { Assoc. M.	Sept. 2, 1891
		{ M. Oct. 3, 1894
HODGE, HARRY SEYMOUR.....	314 Atwood St., Detroit, Mich.....	Oct. 3, 1894
LA CHICOTTE, HENRY ARTHUR.....	136 Liberty St., New York City.....	Oct. 3, 1894
MAYER, JOSEPH.....	640 Main St., Buffalo, N. Y.	Oct. 3, 1894
POLHEMUS, JOSEPH SUYDAM.....	Empire City, Ore.....	Oct. 3, 1894
RAYMOND, WILLIAM GALT.....	Terrace Place, Troy, N. Y..	Oct. 3, 1894
ROBERTS, NATHANIEL	74 Ocean Ave., { Assoc. M.	Nov. 4, 1891
	Jersey City { M.	May 2, 1894
	Heights, N.J.	
RUDDLE, JOHN	General Supervisor Lehigh Coal and Navigation Co., Mauch Chunk, Pa.....	Oct. 3, 1894
SYMONS, THOMAS WILLIAM.....	Captain Corps of Engi- neers, U. S. A., Port- land, Ore.....	Oct. 3, 1894
TAUSSIG, HUBERT PRIMUS.....	Chief Engineer Terminal R. R. Association, St. Louis, Mo.....	Oct. 3, 1894
TOWER, ASHLEY BEMIS.....	Holyoke, Mass.....	Oct. 3, 1894

ASSOCIATE MEMBERS.

GUPPY, BENJAMIN WILDER.....	Assistant Engi- neer, B. & M. { J.	June 19, 1891
	R. R., Bos- { Assoc. M.	Oct. 3, 1894
	ton, Mass.... }	
HARAHAN, WILLIAM JOHNSON.	Illinois Central R. R. Kan- kakee, Ill.....	Oct. 3, 1894

MARDEN, WALTER REUBEN.....	Pittsburgh Bridge Co., Pittsburgh, Pa.....	April 4, 1894
McKEAN, REGINALD.....	3427 Bell Ave., St. Louis, Mo	May 2, 1894

JUNIORS.

BEHRMAN, GEORGE WILLIAM.....	201 Ross St., Brooklyn, N. Y.....	Oct. 2, 1894
COFFIN, THOMAS AMORY.....	45 Broadway, New York City.....	Oct. 2, 1894
COULSON, BENJAMIN LE FEVRE.....	Amos Bldg., Sidney, O....	Oct. 2, 1894
FAY, FREDERIC HAROLD.....	19 Witherbee St., Marlboro', Mass.....	Oct. 2, 1894
HARKINSON, ALBERT WORTHINGTON..	114 West 45th St., New York City.....	Oct. 2, 1894
HUSSEY, CURTIS GRUBE.....	101 Fifth Ave., Pittsburgh, Pa.....	Oct. 2, 1894

CHANGES AND CORRECTIONS.

HONORARY MEMBER.

WILSON, W. HASELL.....	President Belvidere Delaware R. R., Broad St. Station, Philadelphia, Pa.
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MEMBERS.

ALVORD, JOHN W.....	617 The Rookery, Chicago, Ill.
CONNETT, A. N.....	Chief Engineer, Metropolitan R. R., Washington, D. C.
COPPÉE, H. ST. L.....	Greenville, Miss.
DAVIS, ROB B.....	Superintendent Bushwick Iron Works, Bushwick Ave. and Scholes St., Brook- lyn, N. Y.
DILLMAN, GEORGE L.....	1900 Clinton Ave., Alameda, Cal.
GRAHAM, CHARLES H.....	1 West 129th St., New York City.
GREENE, B. D.....	247 Fifth Ave., New York City.
HARING, JAMES S..	Lock Box 74, Nyack, N. Y.
KENNEDY, W. H.....	Care Oregon Ry. and Navigation Co., Portland, Ore.
LANDRETH, WILLIAM B.....	Chief Engineer Sewer Commission, Cort- land, N. Y.
LINVILLE, JACOB H.....	1119 South Forty-sixth St., Philadelphia, Pa.
MERSEREAU, C. V.....	Assistant Engineer Water Works Exten- sion, 77 East May St., St. Louis, Mo.
MORSS, FOSTER B.....	Saugerties, N. Y.
NELLES, GEORGE T.....	520 Eighteenth Ave., Denver, Colo.
NICOLLS, WILLIAM J.....	1326 Chestnut St., Philadelphia, Pa.
NOYES, ELLIS B.....	Civil Engineer's Office, U. S. Navy Yard, Norfolk, Va.

RAMSEY, JOSEPH, JR.	General Manager Terminal R. R. Association, St. Louis, Mo.
ROBINSON, A. A.	President Mexican Central R. R., 70 Kilby St., Boston, Mass.
STOREY, WILLIAM B., JR.	Nevada City, Cal.
THACHER, EDWIN	33 Telephone Bldg., Detroit, Mich.
WROTNOWSKI, A. F.	173 Common St., New Orleans, La.
YATES, P. K.	32 West 128th St., New York City.

ASSOCIATE MEMBERS.

ARENTZ, F. C. H.	The La Fayette Bridge Co., La Fayette, Ind.
BALDWIN, H. F.	Chief Engineer C. P. and St. L. Ry., Springfield, Ill.
DEWEY, EDWARD W.	216 Quincy St., Brooklyn, N. Y.
FRENCH, J. B.	220 Rochelle Ave., Wissahickon, Philadelphia, Pa.
GIFFORD, GEORGE E.	Engineer and Eastern Manager King Bridge Co., 18 Broadway, New York City.
KERR, H. H.	81 Spring St., Sing Sing, N. Y.
TEMPLE, J. FRED.	Office Engineer Choctaw Coal and Ry., South McAlester, Ind. T.
THOMSON, T. K.	321 East Main St., Stamford, Conn.
WAITE, G. B.	231 East 87th St., New York City.
WILLIAMSON, S. B.	Riverton, Ala.

ASSOCIATE.

BARNES, WILLIAM H.	252 Broad St. Station, Philadelphia, Pa.
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JUNIORS.

FENN, WILLIAM H.	179 College St., Middletown, Conn.
FERGUSON, WILLIAM L.	1635 North 15th St., Philadelphia, Pa.
KELLOGG, NORMAN B.	508 Montgomery St., San Francisco, Cal.
KNAPP, H. M.	1709 First St., Louisville, Ky.
MEYER, HENRY C., JR.	35 Madison Ave., New York City.
OGDEN, HENRY N.	58 North Tioga St., Ithaca, N. Y.
PANI, C. E.	Assistant Superintendent The Guggenheim Smelting Co., Aguascalientes, Mexico.
TENNEY, GEORGE O.	Chattanooga, Tenn.
WALKER, E. D.	605 Union St., Schenectady, N. Y.
WALLACE, W. M.	The Clarendon, Washington, D. C.
WILKERSON, T. J.	P. O. Box 850, Portland, Ore.

RESIGNATION.

MEMBER.

Date of Resignation.

MILLER, REUBEN.	Oct. 2, 1894
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DEATHS.

- PRICE, PHILIP M.....Elected Member May 2d, 1888; died October 4th, 1894.
- STRIEDINGER, JULIUS HERMANN.....Elected Member, February 2d, 1876; died October 7th, 1894.

ADDITIONS TO LIBRARY AND MUSEUM.

- From American Society of Irrigation Engineers, Denver, Colo.:
Annual for 1892-93.
- From Board of Trustees of the Sanitary District of Chicago:
Proceedings, September 12th, 19th, 26th; October 3d, 10th, 17th.
- From Boston Public Library, Boston, Mass.:
Bulletin, October, 1894.
- From California Academy of Sciences, San Francisco, Cal.:
Proceedings. Vol. IV. Part I.
- From College of Architects and Engineers, Florence, Italy:
Proceedings, January-June, 1894.
- From Columbian Liberty Bell Committee, Newark, N. J.:
Liberty Primer.
- From Engineering Association of New South Wales, Sydney, N. S. W.:
Minutes of Proceedings. Vol. VIII. 1893.
- From S. J. Fields, Buffalo, N. Y.:
Second Annual Report of the Bureau of Engineering for 1893.
- From Charles Evan Fowler, Youngstown, O.:
General Specifications for Roofs and Iron Buildings.
- From T. Chalkley Hatton, Wilmington, Del.:
Annual Statement of the Board of Directors of the Street and Sewer Department of Wilmington, Del., for the year ending January 31st, 1894.
- From W. R. Haughton, Rajbari, India:
Report on Rolling Stock Ferries.
- From Holly Manufacturing Company, Lockport, N. Y.:
Portfolio of Proofs of Pumping Engines.
- From Institution of Civil Engineers, London, Eng.:
Minutes of Proceedings. Vol. CXVIII. Brief Subject Index, Vols. LIX to CXVIII.
- From W. C. Kernot, Melbourne, Australia:
Wind Pressure.
- From Thomas B. Lee, New York, N. Y.:
Catalogue of the Exhibit of the Pennsylvania Railroad Company at the World's Columbian Exposition, Chicago, 1893.
- From National Switch and Signal Company, Easton, Pa.:
Reference Catalogue.
- From North-East Coast Institution of Engineers and Ship-Builders, Newcastle, Eng.:
Transactions. Vol. X. 1893-94.
- From Pennsylvania Geological Survey, Philadelphia, Pa.:
Appendix to Grand Atlas. 5 sheets.
- From Arthur Pew, Macon, Ga.:
Twenty-first Annual Report of the Railroad Commission of Georgia. 1893.
- From Public Library, Cincinnati, O.:
Annual Report of Librarian and Treasurer for year ending July 1st, 1894.
- From Royal Institution of Engineers, Hague, Holland:
Proceedings and Transactions, September, 1893.
- From State Meteorological Bureau, Albany, N. Y.:
Third and Fourth Annual Reports, 1892-93.
- From Technicum Mittweide, Mittweide, Germany:
Programme for 28th School Year, 1894.
- From U. S. Department of Labor:
Eighth Annual Report of the Commissioner of Labor, 1892.
- From U. S. Department of State:
Consular Reports, October, 1894.
- From U. S. Navy Department:
Annual Report of the Chief of the Bureau of Steam Engineering, 1894.
- From U. S. War Department, Chief of Engineers:
Report of Board of Engineers upon New York and New Jersey Bridge.
Fifty-nine Specifications for the Improvement of Certain Rivers and Harbors.
- From University of the State of New York, Albany, N. Y.:
Regents' Bulletins for July and August, 1894.
- Extension Teaching and Summer Schools.
- From L. F. Vernon-Harcourt, London, Eng.:
The Training of Rivers.
- From E. A. Ziffer, Vienna, Austria:
Sur les divers Moteurs mécaniques employés pour les Tramways et les Chemins de Fer secondaires.
Note sur l'organisation actuelle des Chemins de Fer locaux en Autriche, et sa modification projetée.
Mittheilungen des Vereines für die Förderung des Local und Strassenbahnwesens, April-October, 1894.

American Society of Civil Engineers.

PROCEEDINGS.

Vol. XX.—November, 1894.

MINUTES OF MEETINGS.

(Abstract of such as may be of general interest to Members.)

OF THE SOCIETY.

NOVEMBER 7TH, 1894.—The Society met at 20 o'clock, Director Foster Crowell in the chair; F. Collingwood, Secretary; and present, also, 60 Members and 16 visitors. Ballots were canvassed and the following candidates declared elected. As Members: Frank Chester Beardsley, Macdonald, W. Va.; Richard Despard Dodge, Brooklyn, N. Y.; William Lacy Kenly, Baltimore, Md.; Spencer Miller (elected Associate July 3d, 1889), New York City; Alfred Williams Trotter (elected Junior September 5th, 1883), New York City. As Associate Members: Clarence Walter Hudson, Phoenixville, Pa.; George Alfred Lund, New York City; Camilo Enrique Pani (elected Junior July 2d, 1890), Tampico, Mexico; Homer Reed Stanford (elected Junior October 1st, 1890), Buffalo, N. Y.

Announcement was made of the election by the Board of Direction of six Juniors.

The death of Julius Hermann Striedinger (elected Member February 2d, 1876) on October 7th, 1894, was announced.

A paper by J. A. L. Waddell, M. Am. Soc. C. E., on "The Halsted Street Lift-Bridge" was read by the Secretary and discussed by Messrs. Lindenthal, L. L. Buck, H. W. Brinckerhoff, G. H. Thomson, Skinner, Emery, Long, Crowell, H. C. Meyer, Deans and Treadwell. Written discussions were also read from Mr. T. W. Heermans and S. M. Rowe, M. Am. Soc. C. E.

NOVEMBER 21ST, 1894.—The Society met at 20 o'clock, Director Joseph M. Knap in the chair; F. Collingwood, Secretary, and present, also, 80 Members and 13 visitors.

Mr. Cope Whitehouse delivered a lecture on "The Proposed Reservoirs for the Storage of the Surplus Flood-Waters of the Nile and the Raiyan Drainage Canal." It was illustrated by lantern slides showing the plans submitted to a technical commission consisting of Sir Benjamin Baker, M. Boulé and Sig. Torricelli.

A unanimous vote of thanks was given to Mr. Whitehouse for his interesting presentation of the subject.

OF THE BOARD OF DIRECTION.

NOVEMBER 5TH, 1894.—Nine Members present.

The Committee to Award the Norman Medal was announced as follows: George F. Swain, Arthur Pew and John C. Chase.

The Committee to Award the Rowland Prize was announced as follows: Robert Cartwright, S. S. Wheeler and F. Collingwood.

The resignation of C. E. Marvin, M. Am. Soc. C. E., was presented and accepted.

A letter from Walter McCulloh, M. Am. Soc. C. E., Secretary of the Local Committee of Arrangements at the last Annual Convention, enclosing \$97.55 surplus of funds in the hands of that Committee as a donation to the Library of the Society was presented.

The donation was accepted with the thanks of the Board speaking for the Society.

Applications were considered and other routine business transacted.

The following candidates were elected as Juniors: Van Alen Harris, George Evarts Low and Walter Scott Walls.

LIST OF MEMBERS.

ADDITIONS.

MEMBERS.		Date of Membership.
BEARDSLEY, FRANK CHESTER.....	Engineer Turkey Knob Coal Co., Macdonald, W. Va.....	Nov. 7, 1894
DODGE, RICHARD DESPARD.....	262 Henry St., Brooklyn, N. Y.....	Nov. 7, 1894
HANSEL, CHARLES	Vice-President and General Manager The National Switch and Signal Co., Easton, Pa...	Oct. 3, 1894

NOVEMBER PROCEEDINGS.

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KENLY, WILLIAM LACY.....	Chief Engineer Water Department, Baltimore, Md.....	Nov. 7, 1894
MONCRIEFF, ALEXANDER BAIN.....	Engineer-in-Chief, Province of South Australia, Adelaide, S. A..	July 4, 1894
MORGAN, THOMAS WOLFE.....	Room 57, Macdonough Bldg., Oakland, Cal...	May 2, 1894
TROTTER, ALFRED WILLIAMS.....	112 East 127th St., { J. Sept. 5, 1883 New York City... { M. Nov. 7, 1894	

ASSOCIATE MEMBERS.

HUDSON, CLARENCE WALTER.....	Phoenixville, Pa.....	Nov. 7, 1894
JOHNSON, WILLIAM STONE.....	38 Clinton St., Brooklyn, N. Y.....	June 6, 1894
LUND, GEORGE ALFRED.....	Atlas Iron Co., New York City.....	Nov. 7, 1894
STANFORD, HOMER REED.....	Care Platt & Letchwork, { J. Oct. 1, 1890 Buffalo, N. Assoc. M. Nov. 7, 1894 Y.....	
VAN ORNUM, JOHN LANE.....	Washington University, St. Louis, Mo.....	Oct. 3, 1894

ASSOCIATE.

McKENNA, CHARLES FRANCIS.....	155 West 91st St., New York City.....	June 5, 1894
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JUNIORS.

BOLLER, ALFRED PANCOAST, Jr.....	Care Henry R. Worthington, Brooklyn, N. Y..	Oct. 2, 1894
HARRIS, VAN ALLEN.....	223 Warburton Ave., Yonkers, N. Y.....	Nov. 6, 1894
LOW, GEORGE EVARTS.....	12 Downing St., Brooklyn, N. Y.....	Nov. 6, 1894
WALLS, WALTER SCOTT.....	Care Elmira Bridge Co., Elmira, N. Y.....	Nov. 6, 1894
WINFREE, PEYTON BROWN.....	City Engineer, Bradford, Conn.....	Oct. 2, 1894

CHANGES AND CORRECTIONS.

MEMBERS.

BUCHHOLZ, C. W.....	21 Cortlandt St., New York City.
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BURR, EDWARD	First Lieut., Corps Engineers, U. S. A., District Commission, Washington, D. C.
COBB, R. L.	Chief Engineer Ohio Southern R. R., Society for Savings Bldg., Cleveland, O.
GOAD, CHARLES E.	53 New Broad St., E. C., London, Eng.
HAINS, P. C.	Lt.-Col. Corps Engineers, U. S. A., Tompkinsville, Richmond Co., N. Y.
HAZLEHURST, GEORGE B.	1215 N. Charles St., Baltimore, Md.
HERMANN, E. A.	3455 Longfellow Boulevard, St. Louis, Mo.
KIERSTED, W.	58 Water Works Bldg., Kansas City, Mo.
LOWRIE, H. C.	P. O. Box 380, Denver, Colo.
MORDECAI, AUG.	Assistant Chief Engineer, N. Y., L. E. & W. R. R., Garfield Building, Cleveland, O.
MOSMAN, A. T.	Coast Survey Office, Washington, D. C.
PETRY, ALFRED	U. S. Engineer office, Nashville, Tenn.
QUINTUS, J. C.	121 Franklin St., Buffalo, N. Y.
SMITH, MILLER A.	Puerto Barrios, Guatemala, C. A.
STEPHENS, C. F.	2739 Dickson St., St. Louis, Mo.
VANCE, HART	516 W. Jefferson St., Louisville, Ky.
WHEELER, L. L.	Assistant Engineer, I. and M. Canal, Sterling, Ill.

ASSOCIATE MEMBERS.

CONNOR, E. H.	Athens, Pa.
HILL, JOHN E.	299 Potter's Ave., Providence, R. I.
JACKSON, J. F.	215 16th St., Milwaukee, Wis.
KERR, H. H.	Fort Worth, Tex.
MILLER, S. B.	28 West 20th St., New York City.
MOORE, CHARLES H.	226 W. Franklin St., Germantown, Pa.

JUNIORS.

BLODGETT, JOHN	755 Superior St., Cleveland, O.
BYERS, M. L.	(Care P., C., C. & St. L. R. R.), Logansport, Ind.
HAYES, GEORGE S.	70 Clifton Place, Brooklyn, N. Y.
LAWTON, PERRY	Assistant Engineer, N. Y., N. H. & H. R. R., Providence, R. I.
PHILLIPS, H. C.	Engineer's office, N. Y., N. H. & H. R. R., Jamaica Plain, Mass.
TAPPAN, ROGER	249 Berkeley St., Boston, Mass.

RESIGNATION.

MEMBER.

Date of Resignation.

MARVIN, CHARLES EZRA..... Nov. 6, 1894

DEATH.

CARD, JOSEPH P.....Elected Associate, Sept. 5, 1883; died
Oct. 22, 1894.

ADDITIONS TO
LIBRARY AND MUSEUM.

- From H. Bechhold, Frankfurt, Germany:
Die Maschinellen Hilfsmittel der Chemischen Technik.
- From G. Bouscaren, Cincinnati, O.:
Report of the Board of Engineers upon New York and New Jersey Bridge.
- From Bureau of Statistics of Labor, Boston, Mass.:
Twenty-fourth Annual Report of the Statistics of Labor, 1893.
- From Committee on Finance, U. S. Senate:
Bulletins on Tariff Inquiries, Nos. 1 to 51.
- From J. V. Davies, New York, N. Y.:
General Report upon the Initiation and Construction of Tunnel under the East River, New York.
- From Detroit Bridge and Iron Works, Detroit, Mich.:
Two framed photographs of Bridges on E. T. V. and Ga. Ry. and C. C. C. and St. L. Ry.
- From E. M. G. Eddy, Sydney, N. S. W.:
Annual Report of the Railway Commissioners, New South Wales, for the year ending June 30th, 1894.
- From Engineer Department of the District of Columbia:
Report of the Operations for the year ending June 30th, 1893.
- From Engineer and Superintendent, Public Works Department, St. Johns, N. B.:
Report on Sewerage and Water Supply, 1893.
- From James Fisher, Winnipeg, Man.:
Water Transportation and Freight Rates.
- From Imperial University of Japan, Tokio, Japan:
The Calendar for 1893-94.
- From Institution of Engineers and Shipbuilders in Scotland, Glasgow, Scotland:
Transactions, Vol. XXXVII.
- From William Jackson, Boston, Mass.:
Twenty-seventh Annual Report of the City Engineer, Boston, Mass., for the year 1893.
- From Edw. H. Keating, Toronto, Canada:
Annual Report of the Chief Engineer of Toronto for 1893.
- From l'Ecole Polytechnique de Delft, Holland.:
Annales. Vol. VIII, 1894. Parts 1 and 2.
- From Lea McI. Luquer, Ph. D., New York:
The Optical Recognition and Economic Importance of the Common Minerals Found in Building Stones.
- From Massachusetts State Board of Health:
Twenty-fifth Annual Report.
- From Mansfield Merriman, Bethlehem, Pa.:
Address before the Section of Mechanical Science and Engineering, American Association for the Advancement of Science. August, 1894.
- From H. G. Pearson, Memorial Committee, N. Y.:
A Memorial Address by Edwin L. Godkin.
- From Arthur Pew, Macon, Ga.:
Notes on Government Railroads.
- From Pullman Palace Car Co., Chicago, Ill.:
The Strike at Pullman.
- From Hamilton Smith, London, Eng.:
Half-Yearly Report of the El Callao Mining Company.
- From State Agricultural College, Fort Collins, Colo.:
The Measurement and Division of Water. The Russian Thistle.
- From U. S. Coast and Geodetic Survey:
Report of the Superintendent for the year ending June 30th, 1892.
- From U. S. Department of Agriculture:
Report of the Chief of the Weather Bureau for 1893.

- Report of the Chief of the Division of Microscopy for 1893.
State Laws relating to the Management of Roads, enacted in 1888-93.
Proceedings of the Minnesota Good Roads Convention.
Improvement of the Road System of Georgia.
Report on Road-Making Materials in Arkansas.
Information regarding Road Materials and Transportation Rates in certain States west of the Mississippi River; States north of the Ohio River, and in certain Eastern and Southern States.
Earth Roads; Hints on their Construction and Repair.
State Aid to Road Building in New Jersey.
Proceedings of a Convention of the National League for Good Roads.
- From U. S. Department of State:
Consular Report for November, 1894.
From U. S. Geological Survey:
Fifty-three Geological Maps of various States and Territories.
From U. S. War Department, Chief of Engineers:
Eighteen Specifications for the Improvement of Certain Rivers and Harbors.
From Lionel B. Wells, Manchester, Eng.:
A Sketch of the History of the Canal and River Navigations of England and Wales, and of their present condition, with suggestions for their future development.
From E. D. Worcester, Secty., N. Y.:
Annual Report of the N. Y. Central and Hudson River Railroad Company for the years ending June 30th, 1892, 1893, 1894.

American Society of Civil Engineers.

PROCEEDINGS.

Vol. XX.—December, 1894.

MINUTES OF MEETINGS.

(Abstract of such as may be of general interest to Members.)

OF THE SOCIETY.

DECEMBER 5TH, 1894.—The Society met at 20 o'clock, Director Joseph M. Knap in the chair; F. Collingwood, Secretary; and present, also, 76 Members and eight visitors. Ballots were canvassed, and the following candidates were declared elected. As Members: Charles Alfred Hasbrouck (elected Junior March 7th, 1887; Associate Member February 3d, 1892), Chicago, Ill.; William Anthony Lydon (elected Junior January 4th, 1888), Chicago, Ill.; Richard Calvin McCalla (elected Junior July 2d, 1890), Tuscaloosa, Ala.; George Llewellyn Nicolson, Georgetown, D. C.; Andrew Jackson Wiley, Grand View, Idaho. As Associate Members: John Needels Chester (elected Junior December 6th, 1892), New Rochelle, N. Y.; William Conquest Tucker (elected Junior May 5th, 1891), Englewood, N. J.; Aaron Howell Van Cleve (elected Junior May 31st, 1892), Niagara Falls, N. Y.

The election by the Board of Direction of six Juniors was announced.

A paper by John Thomson, M. Am. Soc. C. E., on "Platen Presses for Letter-Press Printing, Embossing, Stamping, Cutting and Scoring," was presented by the author, with lantern slides, and was informally discussed by Members present.

DECEMBER 19TH, 1894.—The Society met at 20 o'clock, Director Joseph M. Knap in the chair; F. Collingwood, Secretary; present, also, 85 Members and 17 visitors.

The following deaths were announced: William Bradford Jewett, elected Junior June 4th, 1891; died November 9th, 1894. Herbert Andrew Young, elected Junior May 7th, 1884; died December 8th, 1894.

A paper on "Wind Bracing in High Buildings," by Guy B. Waite, Assoc. M. Am. Soc. C. E., was presented by the author, and discussed by Messrs. T. C. Clarke, Emery, Garrigues, Post, Purdy, Just, and the author.

A paper by Mansfield Merriman, M. Am. Soc. C. E., on "The Strength and Weathering Qualities of Roofing Slates," was read by the author.

OF THE BOARD OF DIRECTION.

DECEMBER 4TH, 1894.—Seven Members present. Action was taken in regard to the future issuance of Certificates of Membership.

The nomination of John F. Wallace, M. Am. Soc. C. E., for the office of President for the ensuing year, signed by 10 members of the Society, was received and ordered sent out on the ballot, under Article VII, Section 1, of the Constitution.

Proposed amendments in relation to the appointment by the Board of an Assistant Secretary were received and ordered sent out to the Membership, under Article IX, Sections 1 and 2, of the Constitution.

Messrs. Charles Warren Hunt, Charles H. Myers and Alfred W. Trotter were appointed a committee to take charge of the arrangements for the Annual Meeting.

Applications were considered and other routine business transacted.

MEMOIRS OF DECEASED MEMBERS.

FRANCIS C. LOWTHORP, F. Am. Soc. C. E.

DIED JUNE 1ST, 1890.

Mr. F. C. Lowthorp was an eminent engineer in a generation now nearly passed away. Born in 1810, his earliest recollections were of incidents of the War of 1812, and his career as an engineer commenced in the early days of considerable engineering work in this country. His first experience in his profession was in the construction of the Delaware and Raritan Canal, of a section of which he had charge. In 1835 the Lehigh Coal and Navigation Company began the construction of the Upper Grand section of its canal extending through

the Lehigh Valley from White Haven to Mauch Chunk, Pa. It was designed to aid in bringing the anthracite coal of the Lehigh region to the markets at and near the seaboard. It was a bold engineering work and required the erection of immense dams and locks. Mr. Lowthorp was the principal assistant engineer on this work and had immediate supervision of the erection of several of these locks, and, among others, of one located 2 miles above Penn Haven, known as the Barn Door lock. This lock had a single lift of 65 ft., and was the greatest ever built before or since. Upon the completion of this division of the canal, in 1838, Mr. Lowthorp, with three other gentlemen, Messrs. Bachman, Guiteau and High, erected an iron furnace at Mauch Chunk and experimented in the smelting of anthracite iron. Just previously the attempt had been made in Great Britain to smelt iron ore with anthracite coal by means of the hot blast, and vague rumors of these experiments had reached this country, and these gentlemen, with only the most general knowledge of the new process, succeeded in their experiment and produced and marketed the first anthracite iron made in America. Their furnace was the pioneer of all the vast iron industries of the country dependent upon anthracite coal for their work and of those which have built up the famous Lehigh Valley. Mr. Lowthorp was next employed in the construction of the inclined planes of the Penn Haven Coal Company at Penn Haven, and upon their completion he took charge of the construction of the bridges of the Beaver Meadow Railroad, which were built from his designs. He was then engaged for a season upon the enlargement of the Schuylkill Canal, and soon afterwards he received the first award for plans for an iron bridge which the city of Philadelphia proposed to build across the Schuylkill River at Chestnut Street. He then removed to Harrisburg, Pa., where he designed and superintended the construction of the bridge of the Pennsylvania Railroad across the Susquehanna River. In 1851-54 he was employed in the construction of the Lehigh Valley Railroad, holding the position of Engineer of Bridge Construction, and designed and supervised the erection of the bridges of that railway. Upon the completion of that road he settled in Trenton and about that time invented his well-known turn-table and pivot, which have been used by railways in most every part of the country. In 1856 and 1857 he designed and constructed what was then the greatest railway bridge in America. This notable structure was erected for the Catasauqua and Foglesville Railroad, across the Jordan Creek and Valley, in Lehigh County, Pa. It was 1 120 ft. long and 89 ft. high, and, together with its supports, was built wholly of iron. It was of such novel and simple construction that several prominent engineers demonstrated, mathematically, that the bridge would fall under the weight of the first train which should start to cross it. Their predictions were not verified, however, as the bridge still stands, and is

daily subjected to the load of trains and locomotives fully twice as heavy as those in use when the bridge was built, and far heavier than the most sanguine railway promoter of that day could have imagined. After the completion of that great work Mr. Lowthorp devoted his entire time to the designing and construction of iron bridges and turntables, of which he built a great many in this and other States. One of the earliest of these bridges was the Newark Bay Draw, of the New Jersey Central Railroad, which was a notable structure in its day. This was followed by a number of large and important works, and many smaller ones.*

In 1876 he retired from business and lived quietly at his home in Trenton, N. J., until his death. He devised a distinct system of iron bridge construction, which bears his name. His long lifetime spans back to a period prior to the building of the first locomotive, and he had almost attained to manhood before the first steam railway was built in America. It is difficult to realize the great changes and advances in engineering work which he has witnessed and in which the efforts of his long and active life form an honorable chapter.

Mr. Lowthorp was elected a Member of the Society April, 1868, and became a Fellow March 17th, 1870.

JULIUS HERMANN STRIEDINGER, M. Am. Soc. C. E.†

DIED SEPTEMBER 28TH, 1894.

Julius Hermann Striedinger passed through a long and useful career as a civil and mining engineer, having been connected at one time with some of the most prominent engineering works of the country.

He was a Bavarian by birth (born in 1841), and intended for the army, his earlier education having been directed to that end. He graduated at the Royal Bavarian Military Academy, and at the Artillery and Engineering School of Munich. He was also an Ancien Élève of the Polytechnic School of Augsburg, and when he was commissioned by the Government, he entered the Engineer Corps of the Army and served as Junior Lieutenant until he resigned, to go to the United States.

He arrived at New York when about twenty-three or twenty-four years old, and took a special course of study at the School of Mines, Columbia College, N. Y.; at the Mineralogical Laboratory of Yale University, and at a nautical school in New York. He soon became professionally engaged on public works, and, under Col. P. C. Hains,

* A paper on "The Use of Cast Iron for the Composite Members of Iron Bridges" was read by him at the Second Annual Convention of the Society held June 15th, 1870, an abstract of which will be found in the first volume of the *Transactions*.

† Memoir prepared by Otto von Geldern, M. Am. Soc. C. E.

made surveys and drawings for the fortifications near Cape Fear River, N. C. He was an assistant of General J. H. Wilson during the construction of the Keokuk and Nashville Canal. He next taught descriptive geometry and mechanical drawing at Cooper Institute, and instructed the Corps of Sappers and Miners of the New York Fire Department.

In 1866 he was entrusted by General John Newton, Corps of Engineers, U. S. A., with the examinations and surveys of the East, Harlem, Passaic and Raritan rivers, Keyport and Port Chester harbors, and the principal water-ways, for the purposes of improvement. In 1873 he was superintendent, under General Newton's direction, of the submarine rock drilling, blasting and dredging operations in New York Harbor. His main field of operation was the well-known Hell Gate locality, where his services in devising the method of simultaneously firing numerous mines by means of electricity soon brought him prominently to the front. He made a number of useful inventions, and frequently discussed his methods and results before the American Society of Civil Engineers.

These discussions are preserved in the earlier records of the Society, two of the more prominent subjects being: "The Simultaneous Ignition of Thousands of Mines," and "Igniting Blasts by Means of Electricity"; to the latter was awarded the Norman Book Prize, November 7th, 1877. His labors in this direction were acknowledged on several occasions. The exhibition of a model of the Hell Gate blasting apparatus at the Paris Exposition gained for him the award of a gold medal, and a similar model and description of the apparatus used by him in the ignition of mines caused the King of Spain to decorate him with an order of merit.

In the year 1879 or 1880, he went to South America under a three-years' contract with the Government of Colombia, and became the Chief Engineer of the Magdalena River improvement. He devised and introduced the dredge and snag-boat *Cristobel Colon*, and the sub-aqueous drilling apparatus afterwards imitated on the Panama Canal work. He also made surveys and designs for supplying the Colombian city Bucaramanya with water and electric light.

After his return from a successful work in that country, he was employed for a time under Col. P. C. Hains on the Potomac River improvement, after which he settled in Arizona, and became prominently connected with the mining interests of the Territory. For a number of years he held the position of Superintendent of the Independence Gold and Silver Mine.

He came to San Francisco in 1890, and was for a short time in local charge of the Harbor Improvement Works at Humboldt Bay under Major W. H. Heuer, Corps of Engineers, U. S. A.

In 1892 he made another extensive trip to South America, for the purpose of studying the mining interests of the Colombian Republic.

During the year 1893 and up to the time of his death in 1894, he was located in San Francisco, engaged in private practice as a civil and mining engineer.

On October 7th, 1894, a body, which was identified as that of Mr. Striedinger, was found on the coast of Lower California, near the Mexican town of Ensenada. He had left San Francisco, for Ensenada, on September 25th, arrived at his destination on the 27th, registered at the hotel "Iturbide," and left on the 28th in company with a peon, the purpose of his visit to Lower California being the examination of certain mining property. Nothing was heard of him until his body was found on the ocean beach nine days later.

He was unmarried and had no relatives in California, and when the news of his tragic end reached his colleagues at San Francisco, several members of the California Association of Civil Engineers, and the Technical Society of the Pacific Coast, placed themselves in communication with the Mexican authorities and with his relatives in New York, and marked the place of his burial in an appropriate manner.

In him the profession has lost an able representative, and his colleagues a genial and generous companion. He was liberal to a fault, and no appeal to him for aid, support or sympathy ever went unheeded. He loved his chosen profession and interested himself in all science, so that his attainments covered almost every field. He possessed a prodigious memory, and retained nearly every subject to which he had given his attention by a most careful method of reading. His social standing and acknowledged talents gave him many an opportunity to gain wealth, but the high principles held by him never allowed him to swerve from that path which his manhood and the regard in which he held his profession caused him to lay down as the only one to follow, regardless of personal success or failure.

After his varied career and long wanderings he has found a resting place in a strange land, but in a land of sunshine and continual spring, where storms and tempests are unknown, and where the tranquility of its fair surroundings are symbolic of a peaceful and undisturbed repose.

Mr. Striedinger became a member of the American Society of Civil Engineers February 2d, 1876.

PHILIP M. PRICE, M. Am. Soc. C. E.*

DIED OCTOBER 4TH, 1894.

Philip M. Price was born in Philadelphia, November 27th, 1848. His father was prominent in business in that city and was the first

* Memoir prepared by Col. William P. Craighill, Pres. Am. Soc. C. E.

President of the Sunbury and Erie Railroad. His uncle, Mr. Eli K. Price, was a prominent lawyer in the same city. They were descended from a long line of Quakers, the first Philip Price having been one of the Welsh Quakers who came to this country and settled near Philadelphia in 1668. Captain Price's only brother is the General Manager of the Cambria Iron Works at Johnstown, Pa.

When young Price was eight years of age he was placed at a school in Trenton, N. J., in the family and under the personal care of the principal, Mr. Samuel Backus, who was particularly happy in his influence over boys. Two years later, after the death of Mr. Backus, he was removed to a military academy at Westchester, Pa., and, still later, when he was thirteen or fourteen years old, he was at Hartford, Conn., in the care of Charles Dudley Warner, a friend of the family. He expected to enter Yale, but became filled with a strong desire to go to West Point.

He succeeded in securing an appointment to the Military Academy, and, after the usual term at that institution, he graduated fourth in his class. The following extract from the order of the Chief of the Corps of Engineers of the U. S. Army, announcing the death of Captain Price, gives the main facts of his history as an engineer.

"Besides serving at Fort Riley and twice with the Battalion of Engineers, he has been engaged on geographical explorations and surveys, the survey of the Great Lakes and the Mississippi River, and on works of internal improvement; he had been Assistant Professor of Mathematics and Instructor of Practical Military Engineering at the U. S. Military Academy. Early in the current year he had been assigned to duty as Engineer-Secretary of the Light House Board, and was traveling on that duty at the time of his sudden death.

"Captain Price was zealous and persistent in his personal application to duty, and the Corps of Engineers has met with a serious loss in his death."

His last service was as Secretary of the Light-House Board in Washington. At his death the following resolutions were adopted, showing the high esteem in which he was held by those with whom he was in close personal and professional contact.

"The Naval Secretary announced that Captain Philip M. Price, Corps of Engineers, U. S. A., Engineer Secretary of the Light-House Board, died suddenly on board the L. H. Tender *Jessamine*, at Fort Monroe, on October 4th, 1894, at 7.30 p.m., while on duty making a tour of inspection, whereupon it was—

"*Resolved*, That in the death of Captain Philip M. Price, Corps of Engineers, U. S. Army, the Light-House Board has lost an industrious and faithful member;

"*Resolved*, That the Board has lost in his death a secretary who showed high ability as an executive officer;

"*Resolved*, That we, his brother members of the Board, deplore his death, as thus we have each lost a personal friend, who, by his kindness of heart and genial bearing, has commanded our respect and won our affection;

"Resolved, That we tender to the widow of the deceased our sympathy in her great bereavement;

"Resolved, That these resolutions be spread on the Journal of the Board, and that a properly engrossed and certified copy of them be sent to the widow of the deceased."

As the writer can testify, Captain Price was a most efficient officer, and one who drew many hearts to him by his attractive personality. He was as modest as he was accomplished, and had some of the characteristics of the Quaker stock, from which he derived his descent. A gentleman of varied culture and wide information, of genial, frank presence and warm heart, yet a thorough soldier, he had troops of personal friends, not alone in the service which had been his life's work and which he has fulfilled, at every post, with distinction that gave promise of a yet more brilliant career, but in the walks of civil and social life as well.

In May, 1879, Captain Price married Mrs. Emma Moss Brayton, only daughter of Mr. and Mrs. A. H. Moss, of Sandusky, O. It was a most happy union, and the sincere sympathy of a large circle of friends has gone out in large measure to the stricken wife.

Captain Price was a consistent member of the Episcopal Church and a truly noble and lovable man in every relation of life.

The following testimonial from an assistant of Captain Price gives proof of his value as a public officer and his lovely tone as a man. Others of the same kind could be added.

"As an officer in charge of public works, he was regarded by all of his subordinates who were in position to know him well as an unusually satisfactory man to serve with. We all understood that he required strict, careful and prompt attention to business, and yet there was always a friendly kindness in his manner that tempered the severity of his requirements. On his frequent visits to his works, he always appeared interested in every detail, so that while his assistants were allowed a considerable latitude, they felt that what they did, whether good or bad, would be critically noticed.

"In the management of the district, everything was well systematized and the details adapted to the local surroundings, so that the works were conducted in a prompt, business-like way.

"In his intercourse with his subordinates of all grades he was kindly and considerate, and we all felt that he took a personal interest in our welfare. His relations with those who were not employed under him, but with whom he came in contact in a business way or otherwise, were unusually pleasant."

WILLIAM B. JEWETT, Jun. Am. Soc. C. E.

DIED NOVEMBER 7TH, 1894.

Mr. Jewett was born November 8th, 1868, at Northampton, Mass. He graduated from the Northampton High School in 1885, and from

the engineering department of the Worcester Polytechnic Institute in June, 1888. He was employed after graduation for a short time in the office of the City Engineer of Pawtucket, R. I. In the early part of 1889 he was engaged on preliminary surveys for the Worcester and Hartford Railroad. He next acted as Inspector of Bridge Construction on the New York and New England road. In 1890 he became Assistant on city work in New Rochelle, N. Y., and showed marked ability in his work.

His next engagement was with the Pelham Heights Land Association. Afterward, as Assistant, he had responsible charge of the construction of the additional water supply at Bethel, Conn.

His health failing, he went to New Mexico in 1892, and was employed for a time in mining work for the Atchison, Topeka and Santa Fé Company. In the spring of 1893 he returned to New Rochelle, and was employed until June on the sewer system then under construction, when illness again compelled him to leave work, and he went to Florida for the winter, where he died on November 7th of consumption.

Mr. Jewett was elected a Junior of the American Society of Civil Engineers on June 4th, 1891.

JACOB M. CLARK, M. Am. Soc. C. E.

DIED DECEMBER 21ST, 1894.

Jacob M. Clark was born in Vermont in 1829. He graduated from the University at Burlington, Vt., in 1845. James Moore, M. Am. Soc. C. E., who was Chief Engineer of the Vermont Central Railroad, writes of him as follows :

"In December, 1846, at West Hartford, Vt., I first met Jacob M. Clark in a corps with other young engineers. They were all boys, strangers to me, and there was great surprise expressed on my selecting Clark as my assistant. I can only say I did it, and I made no mistake. Clark stayed with me until the completion of the Vermont Central, and then went on the Champlain and St. Lawrence Railroad, which was chartered by the Canadian Parliament from Rouse's Point to Montreal.

"Upon again assuming the Chief Engineership of the Central Railroad of New Jersey, recognizing Mr. Clark's special abilities, I sent for him in 1861 to assist me on the location and construction of the main line of that road between Elizabeth and Jersey City, and appointed him Assistant Chief Engineer. Mr. Clark remained in that position and had charge of construction of several branch lines, the widening of the road west of Elizabeth for four tracks, and altering the location of the main line through Fanwood and Plainfield, which

required the construction of an entirely new four-track road, upon which was a large quantity of masonry for road and street bridges.

"Since that time, the valuable knowledge and information he had acquired through 33 years of active service for the latter company has been given freely for its benefit, even to the moment of his death."

The accident causing his death occurred while on special duty for the railroad. He was walking on one of the tracks and saw a train approaching, but failing to see or hear another train moving in the opposite direction, he stepped in front of it, and was struck by the pilot. He was picked up and carried to the nearest station, but lived only a short time after the accident.

Mr. Clark was an excellent engineer, and scholarly in his tastes. He was thoroughly versed in the literature connected with metrology, particularly that of Egypt and other ancient nations.

A wife and four daughters survive him. Mr. Clark became a member of the American Society of Civil Engineers January 29th, 1868. He was a Director of the Society during the years 1869-70, and a Vice-President from November 1st, 1871, to November 5th, 1873.

AUGUSTUS W. BOEKE, M. Am. Soc. C. E.

DIED OCTOBER 24TH, 1894.

A. W. Boeke was born in Kansas City, Mo., on September 16th, 1860. He was City Engineer of Wyandotte City, Kans., during 1881 and 1882; was Deputy County Surveyor of Wyandotte County in 1882 to 1885, inclusive; Assistant City Engineer of Kansas City in 1886, and City Engineer in 1887, 1888 and 1889. He then removed to Argentine, Kan., where he was City Engineer for two years, after which time he became interested in contracting.

He became a Member of the American Society of Civil Engineers September 3d, 1890.

He leaves a widow and two small children.

HERBERT ANDREW YOUNG, Jun. Am. Soc. C. E.

DIED DECEMBER 8TH, 1894.

Herbert Andrew Young was born at Chelsea, Mass., on July 23d, 1857. He entered the Massachusetts Institute of Technology in 1877, but sickness early in 1881 prevented him from graduating with the

class of that year. During the summer of 1880 he was employed temporarily on the Boston and Albany Railroad. In 1881 was chief of party on the Boston and Lowell Railroad in relocating the center line, laying out sidings, etc. In the fall of 1882 he was employed on surveys of lands and yards of the Toledo, Cincinnati and St. Louis Railroad. A year later he became Principal Assistant Engineer on this line, having charge of an examination of the bridges, building a dock, and making plans for station buildings, etc.

During the time the "Clover Leaf" road was in the hands of a receiver, he was in the position of Chief Engineer, and was Assistant in charge of the western division on its reconstruction.

In 1887 he went to Mexico and was employed for a time on the Mexican Central Railroad, and for several years past had been Superintendent of Transportation on the whole Mexican Central system.

He had been spending several weeks in the North, and arrived in Toledo on Thanksgiving night on a visit to his father-in-law, Judge Pratt, at whose residence he died suddenly of peritonitis. He leaves a wife and one son.

Mr. Young was elected a Junior of the American Society of Civil Engineers on May 7th, 1884.

LIST OF MEMBERS.

ADDITIONS.

MEMBERS.		Date of Membership.			
HASBROUCK, CHARLES ALFRED...	American Bridge Works, 40th St. and Stewart Ave., Chicago, Ill.....	{	Jun.	Mar.	7, 1887
			Assoc. M.	Feb.	3, 1892
			M.	Dec.	5, 1894
HOBBY, ARTHUR STANLEY.....	610 and 611 Lincoln Inn Court, Cincinnati, O.....		June		6, 1894
LYDON, WILLIAM ANTHONY.....	79 Dearborn St., Chicago, Ill.....	{	Jun.	Jan.	4, 1888
			M.	Dec.	5, 1894
MCCALLA, RICHARD CALVIN.....	U. S. Assistant Engineer, Tuscaloosa, Ala...	{	Jun.	July	2, 1890
			Assoc. M.	Sept.	2, 1891
			M.	Dec.	5, 1894
MILLER, SPENCER.....	96 Liberty St., New York City.....	{	Assoc.	July	3, 1889
			M.	Nov.	2, 1894
NICOLSON, GEORGE LLEWELLYN..	General Manager Chesapeake and Ohio Canal, Georgetown, D. C.....		Dec.		5, 1894
WILEY, ANDREW JACKSON.....	Chief Engineer Owyhee Land and Irrigation Co., Grand View, Idaho.....		Dec.		5, 1894

ASSOCIATE MEMBERS.

CHESTER, JOHN NEEDELS.....64	S. Pennsyl- vania St., In- dianapolis, Ind.	{	Jun.	Dec.	6, 1892
		{	Assoc. M.	Dec.	5, 1894
PANI, CAMILO ENRIQUE.....	Aguascalientes, Mexico.....	{	J.	July	2, 1890
		{	Assoc. M.	Nov.	2, 1894
STANWOOD, JAMES HUGH.....	Mass. Institute of Tech- nology, Boston, Mass.....			Oct.	3, 1894

JUNIOR.

McKENNEY, CHARLES ALBERT ...1523	Rhode Island Ave., Washington, D. C.....	Dec.	4, 1894
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CHANGES AND CORRECTIONS.

MEMBERS.

BUTTERFIELD, F. E.....	Care Sinaloa Smelting and Refining Co., Culiacan, Sinaloa, Mexico.
CARTER, H. H.....95	Milk St., Room 68, Boston, Mass.
COWLES, W. L.....	Chief Engineer Bridge and Building Dept., Pottsville Iron and Steel Co., Pottsville, Pa.
DAVIS, ROB. B.....	Rochelle Ave., Wissahickon, Philadelphia, Pa.
DECOURCY, B. W.....	911 North Tenth St., Tacoma, Wash.
EMERSON, GEORGE D.....	Nestor, Cal.
FORCE, C. G.....	Dunedin, Fla.
GREENE, J. N.....	Calais, Me.
HINCKLEY, JOHN F.....	Chief Engineer Choctaw, Oklahoma and Gulf Ry., South McAlester, Ind. Ter.
ISAACS, JOHN D.....	76 Union Trust Bldg., San Francisco, Cal.
JENNINGS, W. H.....	Chief Engineer Columbus, Hocking Valley and Athens R. R., Columbia Bldg., Room 35, Columbus, O.
JUENGST, HENRY F.....	City Water Co., East St. Louis, Ill.
LEDERLE, GEORGE A.....	171 La Salle St., Chicago, Ill.
MAN, A. P.....	Chief Engineer Hudson Reservoir and Canal Co., Phoenix, Ariz.
NICHOLS, L. A.....	2 St. James Place, Cincinnati, O.
PATTERSON, J. C.....	Chief Engineer P. & E. R. R., 407 Bullitt Bldg., Philadelphia, Pa.
PETTIGREW, THOMAS.....	Weston, West Va.
PIHL, O. R.....	P. O. Drawer 50, Portland, Ore.
RICE, E. C.....	3518 Lindell Ave., St. Louis, Mo.
SEARS, ALFRED F.....	Goshen, N. Y.
SHAW, GRANVILLE W.....	P. O. Box 742, Columbus, O.
SMITH, S. HARRISON.....	530 California St., Room 9, San Francisco, Cal.
SWAN, CHARLES H.....	Assistant Engineer Boston Transit Commis- sion, 60 State St., Boston, Mass.

TOMLINSON, A. T. 529 The Rookery, Chicago, Ill.
 WILLARD, J. E. Crescent Hill, Ky.
 YEATMAN, C. P. Summit Ave., Price Hill, Cincinnati, O.

ASSOCIATE MEMBERS.

DEWEY, E. W. Fort Plain, N. Y.
 ELLIOTT, JOHN S. 53 Washington Square, New York City.
 KERR, H. H. Quanah, Tex.
 MCKEAN, REGINALD. Choctaw Coal and Ry. Co., South McAlester,
 Ind. Ter.

ASSOCIATES.

DAVIS, J. WOODBRIDGE 1809 I St., N. W., Washington, D. C.
 STONE, WATERMAN. Box 1321, Providence, R. I.

JUNIORS.

ALLEN, T. W. 26 Cortlandt St., New York City.
 BLOSS, WILL. H. Vancouver, Wash.
 HARTWELL, HARRY. Care Johnson Co., Johnstown, Pa.
 INGALLS, O. L. 1332 R St., N. W., Washington, D. C.
 KELLOGG, N. B. 418 California St., Room 3, San Francisco, Cal.
 McCONNELL, E. T. 105 Jefferson Ave., Columbus, O.
 RAASLOFF, H. E. DE. St. Louis Southwestern Ry. Co., Texarkana,
 Tex.
 SPEIDEL, H. S. 565 East 26th St., Paterson, N. J.
 WHEATLEY, A. C. Chief Engineer Nyassa Ry. Surveys, care
 Nyassa Co. Caleo Delgado, East Africa.

RESIGNATIONS.

MEMBERS.	Date of Resignation.
BENSON, FREDERICK S.	Dec. 31, 1894
DEMPSTER, ALEXANDER.	Dec. 31, 1894
FARLEY, GEORGE M.	Dec. 31, 1894
GIELOW, HENRY J.	Dec. 31, 1894
SEYMOUR, CHARLES S.	Dec. 31, 1894
TOWNE, HENRY R.	Dec. 31, 1894

ASSOCIATE.

HANDY, FRANK W. Dec. 31, 1894

JUNIORS.

KOBAYASHI, KATAJIRO. Dec. 31, 1894
 McFARLAND, BOYNTON W. Dec. 31, 1894
 RIGGS, CLINTON L. Dec. 31, 1894
 SMITH, MAXWELL. Dec. 31, 1894
 WOOD, CHARLES F. Dec. 31, 1894

DEATHS.

MEMBERS.

- BOEKE, AUGUSTUS WILLIAM.... Elected Sept. 3, 1890; died Oct. 24, 1894.
 CLARK, JACOB MERRILL..... Elected Jan. 29, 1868; died Dec. 21, 1894.

JUNIORS.

- JEWETT, WILLIAM BRADFORD.... Elected June 4, 1891; died Nov. 9, 1894.
 YOUNG, HERBERT ANDREW..... Elected May 7, 1884; died Dec. 8, 1894.

ADDITIONS TO

LIBRARY AND MUSEUM.

- From William A. Allen, Portland, Me.:
 Thirty-third Annual Report of the
 Maine Central Railroad Company.
 Second Annual Report of the Forest
 Commissioner of the State of Maine,
 1894.
 Thirty-sixth Annual Report of the Rail-
 road Commissioners of the State of
 Maine.
 From Board of Supervisors, San Francisco,
 Cal.:
 San Francisco Municipal Reports for the
 fiscal year 1893-94, ending June 30th,
 1894.
 From Board of Trustees of the Sanitary Dis-
 trict of Chicago:
 Proceedings, December 19th-26th.
 From Boston Public Library:
 Bulletin, January, 1895.
 From Builders' Iron Foundry, Providence,
 R. I.:
 The Venturi Meter.
 From California State Mining Bureau, San
 Francisco, Cal.:
 Twelfth Report of the State Mineralogist
 for two years ending September 15th,
 1894.
 From C. B. Comstock, Brevet Brigadier-
 General, U. S. A., New York:
 Report of the Mississippi River Commis-
 sion for the fiscal year ending June
 30th, 1894.
 From E. L. Corthell, Chicago, Ill.:
 The Tehuantepec Isthmus Railway.
 From Chauncey M. Depew, New York:
 Address at the Unveiling of the Statue
 of Christopher Columbus in Central
 Park, N. Y., May 12th, 1894.
 From P. De May, Ostende, Belgium:
 Etude sur l'Amélioration et l'entretien
 des Portes en plage de Sable et sur le
 régime de la cote de Belgique. Text
 and Plates.
 From R. D. Dodge, New York:
 Sixth Annual Report of the Commission-
 ers of the State Reservation at Niagara,
 October, 1888, to September 30th, 1889.
 General Plan for the Improvement of the
 Niagara Reservation.
 The Use of Fascines in the Public Works
 of Holland.
 Annual Report of the Dismal Swamp
 Canal Company for the year ending
 September 30th, 1868.
 North Shore Railway of Canada. En-
 gineer's Report, 1872.
 The Gyroscope.
 From Field Columbian Museum, Chicago
 Ill.:
 An Historical and Descriptive Account of
 the Field Columbian Museum.
 From J. Leland FitzGerald, Schenectady,
 N. Y.:
 Contract and Specifications for the Con-
 struction of Sewers.
 From Frankfort Chamber of Commerce,
 Frankfort, Germany:
 Yearly Report for 1893.
 From E. A. Fuertes, Cornell University,
 Ithaca, N. Y.:
 Fifth Annual Report of the Meteorological
 Bureau and Weather Service of the
 State of New York, 1893.
 From Bernard B. Green, Washington, D. C.:
 Report upon the Construction of the
 Building for the Library of Congress
 during the year ending December 1st,
 1894.
 From Institution of Civil Engineers, London,
 England:
 List of Members, January 2d, 1895.
 From Institution of Mechanical Engineers,
 London, England:
 Proceedings, July, 1894, Manchester Meet-
 ing.

- From Italian Society of Engineers and Architects, Rome:
Annals, Fascicolo V.
- From William Jackson, Boston, Mass.:
Forty-seven Specifications for Public Work in the City of Boston.
- From Dan. C. Kingman, Capt. of Corps of Engineers, Oswego, N. Y.:
Annual Report upon the Improvement of Harbors on Lake Ontario east of Oak Orchard, N. Y.
- From Massachusetts Board of Harbor and Land Commissioners, Boston, Mass.;
Annual Report for the year 1894.
- From Alexander B. Moncrieff, Engineer-in-Chief, Adelaide, Australia:
Annual Report of the South Australian Railway Commissioners for the year 1893-94.
Report from the Public Works Department (South Australia), for the year ending June 30th, 1894.
- From Montana Society of Civil Engineers, Helena, Mon.:
Measurement of Water.
Report of Committee on "County Surveyors and Road Laws."
- From George S. Morison, Chicago, Ill.:
The Memphis Bridge.
- From William Barclay Parsons, New York:
Report on Rapid Transit on Foreign Cities.
- From W. Ritter, Zurich, Switzerland:
Der Brückenbau in den Vereinigten Staaten Amerikas.
- From Royal Institute of Engineers, Hague: Holland:
Verhandeligen, vertalingen, etc., Tweede Afdeling.
Notulen der vergaderingen. Eerste Afdeling.
- From Shiffler Bridge Company, Pittsburgh, Pa.:
Album of Designs, Building Department.
- From U. S. Civil Service Commission, Washington, D. C.:
Tenth Report, July 1st, 1892, to June 30th, 1893.
- From U. S. Department of State:
Consular Reports, January, 1895.
- From U. S. Department of the Interior:
Report on Insurance Business in the United States, 11th Census, 1890.
- From U. S. Navy Department:
Notes on the Year's Naval Progress, July, 1894.
- From U. S. War Department. Adjutant-General's Office:
Official Army Register for 1895.
- From U. S. War Department, Chief of Engineers:
Twenty-six Reports on the Improvement of Certain Rivers and Harbors.
Report as to Maximum Span Practicable for Suspension Bridges.
Seventeen Specifications for the Improvement of Certain Rivers and Harbors.
- From University of Michigan, Madison, Wis.:
The Evolution of a Switchboard.
The Steel Construction of Buildings
- From E. A. Ziffer, Vienna, Austria:
Mittheilungen des Vereines für die Förderung des Local- und Strassenbahnwesens, November, December, 1894.
Note sur l'organisation actuelle des Chemins de Fer d'intérêt local en Hongrie.
- Die VIII. Generalversammlung des Internationalen permanenten Strassenbahnvereines.
Die österreichische Regierungsvorlage betreffend den Entwurf eines Gesetzes, womit Bestimmungen für die Anlage und den Betrieb von Localbahnen und Kleinbahnen getroffen werden.